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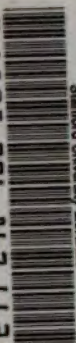
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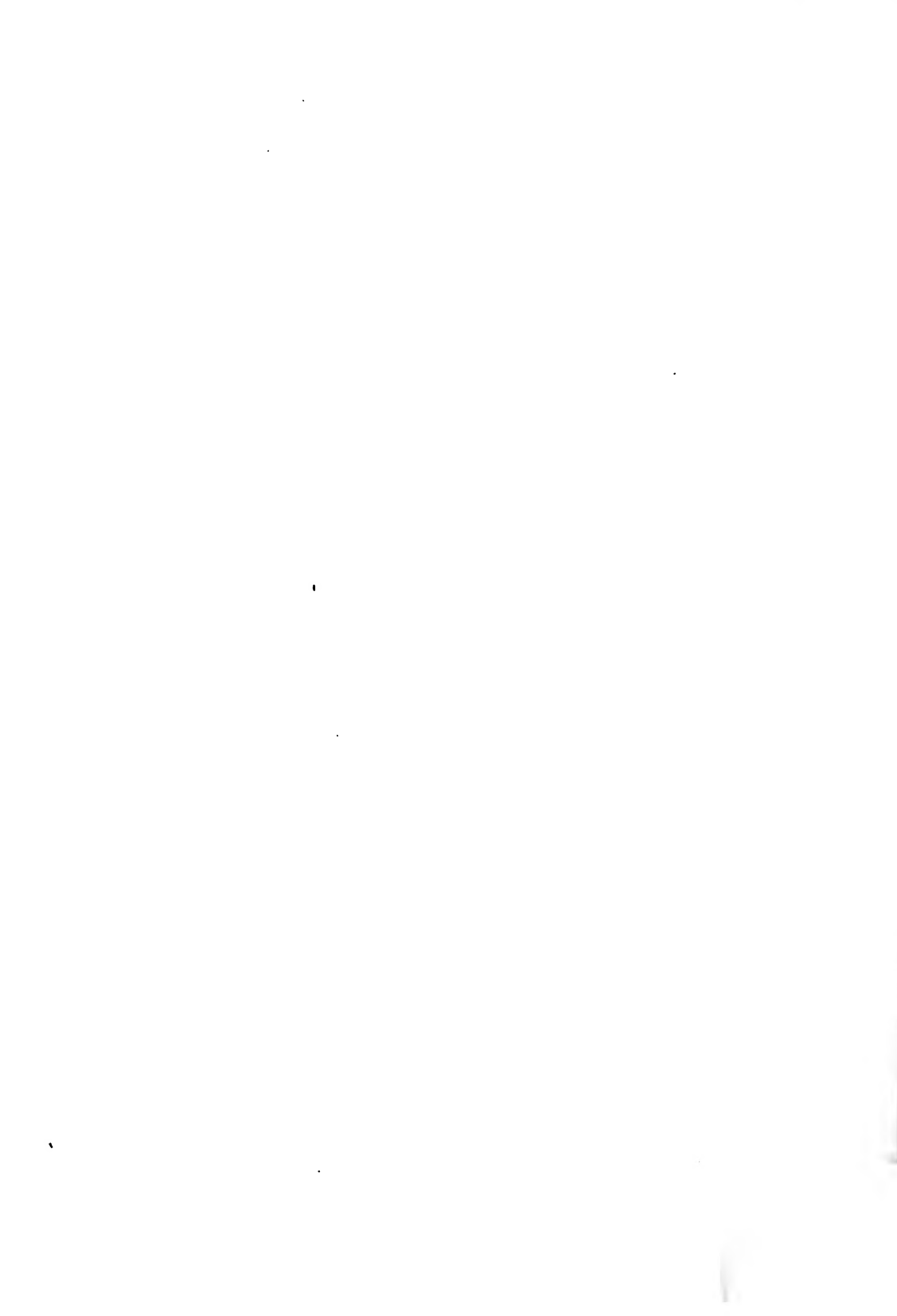


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PROCEEDINGS
OF THE
ZOOLOGICAL SOCIETY OF LONDON.

January 12, 1858.

Dr. Gray, F.R.S., V.P., in the Chair.

The following papers were read :—

1. **NOTES ON CALIFORNIAN BIRDS.** BY THOMAS BRIDGES,
CORRESPONDING MEMBER. COMMUNICATED, WITH RE-
MARKS, BY PHILIP LUTLEY SCLATER.

(Aves, Pl. CXXXI.)

Mr. Bridges has lately forwarded to Mr. Cuming specimens of the following eleven species of birds, with the accompanying notes. I have affixed to them what I believe to be their proper names, and have given a new appellation to a Woodpecker, which appears to have been hitherto unnoticed. Mr. Bridges's second collection was unfortunately lost in the "Central America." Of the first I gave some account in these 'Proceedings' for last year (P. Z. S. 1857, p. 125).

1. **ASTUR ATRICAPILLUS** (Wilson), juv.
Shot in Trinity Valley, Northern California.

2. **TETRAO OBSCURUS**, Say ? ♀.

This species is found ranging along the Sierra Nevada, at an elevation of 4000 to 6000 feet, in the Pine Forests. The specimen now forwarded was taken on Trinity Mountains, N. California. I have also seen the same bird in the Yosemite Valley, near the head waters of the Mercedes River, Mariposa County. Compare this with

No. CCCXLVII.—PROCEEDINGS OF THE ZOOLOGICAL SOCIETY.

Tetrao obscurus; I am almost inclined to believe it differs from that species.

(I must see males of this species before I can consider it different from *T. obscurus*.—P. L. S.)

3. CALLIPEPLA PICTA (Douglas).

Found in flocks in the Sierra Nevada near Shasta.

4. DRYOCOPUS PILEATUS (Linn.).

I have only seen this fine species of Woodpecker in the Pine Forests of the Sierra Nevada, at an elevation of 4000 feet, and there it is somewhat rare, and difficult to capture. The present specimens were taken on Scott's Mountains, Trinity County, in October.

5. MELANERPES TORQUATUS (Wils.), ♀ juv.

This bird I first saw in Scott's Valley, on the *Pinus Benthamiana*. Like the *Melanerpes formicivorus* they live in small communities, as I saw three pairs together in the above locality. In winter they migrate towards the oak-groves at the base of the Sierra Nevada, seeking a milder climate than the snow-covered pine regions.

6. MELANERPES RUBRIGULARIS, Sclater, sp. nov. (Pl. CXXXI.)

Supra nitenti-niger: linea circumnuchali ab oculis incipiente, altera utrinque suboculari a rectu latiore, tectricibus alarum superioribus, dorso postico et caudæ tectricibus superioribus, necnon maculis secundariarum trium extimarum apicalibus et in pogonio externo primariarum tertiæ, quartæ et quintæ albis: subtus nitenti-niger, gula media ruberrima, abdomine medio flavicante, lateribus et crasso albo nigroque variegatis; tectricibus alarum inferioribus et remigum pogonio interiore cinerascenti-nigris, maculis quadratis numerosis albis: caudæ rectricibus omnino nigris: rostro et pedibus nigris.

Long. tota 8·5, alæ 5·4, caudæ 3·5, rostri a fronte 1·0, tarsi 0·8.

(This Woodpecker, which is represented by Mr. Bridges as very rare, appears to have escaped the researches of the American naturalists; at least I am acquainted with no record of its existence, though it may have been described quite lately. It appears to be well placed in the genus *Melanerpes*, of which no less than six species are already known to inhabit California, namely *M. erythrocephalus*, *M. torquatus*, *M. thyroideus* (Cassin, B. Cal. pl. 32: *Picus nataliæ*, Malherbe, Cab. Journ. f. Orn., 1854, p. 271), *M. formicivorus* (Cassin, B. Cal. pl. 2), *M. albolarvatus*, and *M. ruber*. From all these it is quite different in colouring, and may be recognized at once by its black breast and bright scarlet throat-mark, whence I have named it *M. rubrigularis*.—P. L. S.)

A very rare bird, the only one of the species I have ever seen. Shot in Trinity Valley, on the pines. Probably this may occur more frequently in Oregon or the British possessions. Had it been common, I should have seen it in the southern part of the State of California.

7. *MELANERPES ALBOLARVATUS*. — *Leuconerpes albolarvatus*, Cassin, Pr. Ac. Sc. Phil. 1850, p. 106; Journ. Ac. Phil. n. s. iii. p. 257. pl. 22, ♂ et ♀.

This is not uncommon in the Trinity Valley, seeking its food on the tall pines. The male is easily distinguished from the female by the red band of feathers at the base of the cranium.

(Better placed in the genus *Melanerpes* than with *Leuconerpes*. — P. L. S.)

8. *PICUS HARRISI* (Aud.).

Shot near Shasta, base of the Sierra Nevada.

9. *PICUS NUTTALLI*, Gambel.

Taken on the mountains near Shasta in September.

10. *TURDUS NÆVIUS* (Gm.), Bp. Consp. p. 271.

This pretty species of Thrush is very rare in California, as I have only seen two specimens. These I observed in the coast range of mountains west of Santa Clara. It inhabits the evergreen oak-groves, *Quercus densifolia*. Taken in October (female).

11. *CINCLUS AMERICANUS*, Sw.

I have only seen this remarkable bird in the head waters of Trinity and Scott's Rivers at California. It is constantly seeking its food amongst the boulder rocks in the rivers, or on the shallows amongst pebbles; sometimes wading, diving or swimming, and at other times flying from rock to rock. I have often watched them, and always felt a sort of amusement at their restless and singular movements.

San Francisco, Nov. 18th, 1857.

2. MONOGRAPH OF THE ASIATIC SPECIES OF *NEPTIS* AND *ATHYMA*, TWO GENERA OF DIURNAL LEPIDOPTERA BELONGING TO THE FAMILY NYMPHALIDÆ. BY FREDERIC MOORE, ASSISTANT, MUSEUM EAST INDIA COMPANY.

(Annulosa, Pl. XLIX.—LI.)

The following monograph contains descriptions of all the species of the genera *Neptis* and *Athyma* that I have been enabled to bring together from the various collections in this country.

Genus *NEPTIS*, Fabricius.

Neptis, Fabricius, Syst. Gloss. (Illiger's Mag. vi. p. 282, 1808); Horsfield; Westwood.

Acca, p., Hübner, Verz. bek. Schmett (1816).

Limenitis, p., Boisduval, Ind. Meth. Eur. Lep. p. 16 (1840); E. Doubleday.

1. NEPTIS HORDONIA.

Papilio Hordonia, Stoll, Suppl. Cramer, Pap. Exot. i. t. 33. f. 4, 4. D. (1791).

Nymphalis Hordonia, Godart, Enc. Méth. ix. p. 429.

Limenitis Hordonia, E. Doubleday, List Lep. Brit. Mus. pt. 1. p. 93.

Neptis Hordonia, Westwood in Doubleday & Hewitson's Diurnal Lep. p. 271. n. 3; Moore, Catal. Lep. Mus. E. I. C. i. p. 164.

Hab. Silhet; Darjeeling; N. India; Ceylon; Java. In most collections.

Remark.—*Neptis Hordonia* may be known by the mottled markings of the under-side.

2. NEPTIS PATA, Moore. (Pl. XLIX. f. 1.)

Neptis Pata, n. sp.—Upper-side brown-black; markings ferruginous, these being disposed as in *Neptis Hordonia*. May be distinguished from that species by the under-side being black, and without any mottled markings.

Hab. Manilla. In the collection of W. W. Saunders, Esq.

3. NEPTIS TIGA, Moore.

Papilio Heliodore, Fabricius, Ent. Syst. iii. pt. 1. p. 130 (1793); Jones, Icon. iv. t. 76. f. 2 (nec Cramer, 1782).

Nymphalis Heliodore, Godart, Enc. Méth. ix. p. 429.

Limenitis Heliodore, E. Doubleday, List Lep. Brit. Mus. pt. 1. p. 93.

Neptis Heliodore, Westwood in Doubleday & Hewitson's Diurnal Lep. p. 271. n. 4; Moore, Catal. Lep. Mus. E. I. C. p. 164.

Hab. Java; Borneo. In Museum East India Company; British Museum, W. W. Saunders, Esq.

Remark.—*Neptis Tiga* may be distinguished from the two preceding by the well-defined markings of the under-side.

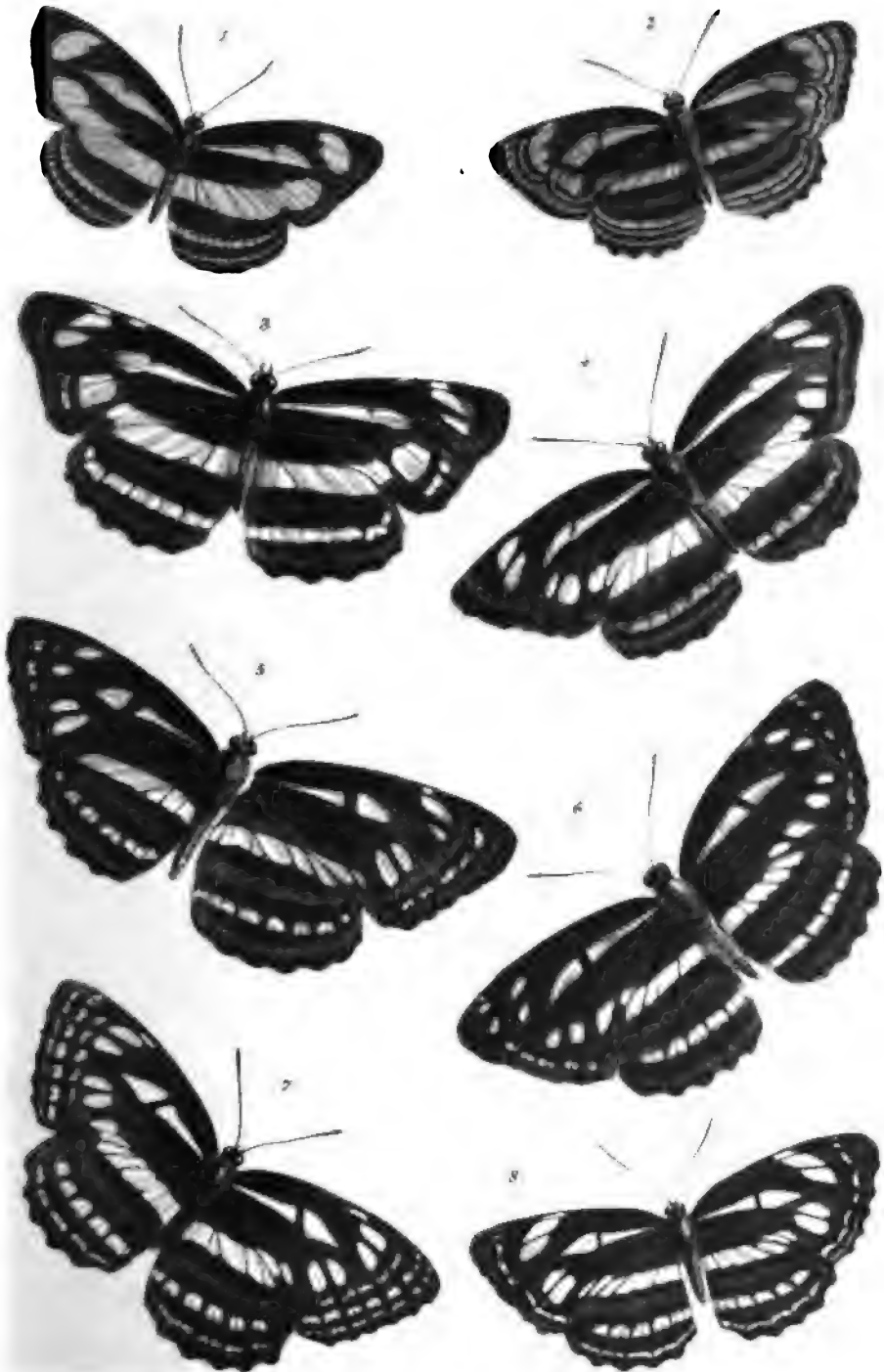
4. NEPTIS ANTARA, Moore. (Pl. XLIX. f. 2.)

Neptis Antara, n. sp. Male.—Upper-side dusky-brown; fore-wing with discoidal streaks, curved interrupted band from costal margin near the apex to middle of posterior margin, and narrow submarginal wavy line, deep ferruginous; indistinct marginal and narrow border to submarginal line, blackish; hind-wing with straight inner and curved narrower outer band deep ferruginous; indistinct marginal and submarginal line, and inward borders to the two bands blackish. Under-side very pale, markings as above, but all having black borders. Expanse nearly 2 inches.

Hab. Celebes. In British Museum Collection.

5. NEPTIS MIAH, Moore.

Neptis Miah, Moore, Catal. Lep. Mus. E. I. C. i. p. 164. pl. a. f. 1 (1857).



1 *Neptis Pata* Moore. 2. *N. Antara* Moore. 3. *N. Narayana* Moore. 4. *N. Amba* Moore.
5. *N. Cohnella* ♂. Cram. 6. *N. Soma*. 7. *N. Ida* Moore. 8. *N. Duryodana* Moore

Neptis Miah.—Upper-side brown-black; fore-wing with a longitudinal streak from base of wing, an oblique transverse short apical fascia, which nearly meets a reversely oblique fascia on posterior margin, rufous; hind-wing with a nearly straight broad inner band and a narrow submarginal band rufous. Under-side dark ferruginous; fore-wing with the longitudinal and oblique marks pinky-white; two narrow submarginal lines purple; hind-wing with inner band pinky-white; two submarginal and a less distinct middle line purple; costal margin at the base whitish. Expanse $2\frac{1}{2}$ inches.

Hab. Darjeeling; N. India. In Museum East India Company, and W. W. Saunders, Esq.

Remark.—Allied to the two preceding species, but may be distinguished by the colour and markings of the under-side.

6. NEPTIS MANASA, MOORE.

Neptis Manasa, Moore, Catal. Lep. Mus. E. I. C. i. p. 165, pl. 4 a. f. 2 (1857).

Neptis Manasa. Male. —Upper-side dull dusky-brown; markings white, tinged with very pale ferruginous; fore-wing with the discoidal streak long, and continued in a curve to near the posterior angle; an apical oblique streak; two small spots on costal margin, and one below the margin; a spot on middle of posterior margin; a marginal row of small indistinct spots; hind-wing with broad inner and narrower outer band, both extending across the abdominal margin; an indistinct marginal line and line between the two bands; narrow cilia white. Under-side pale ochreous, with indistinctly-defined white markings; the discoidal streak is continued uninterrupted to the middle of the posterior margin, the space within being blackish; on the hind margin are some small white markings between the inner band and costal vein. Expanse $2\frac{1}{2}$ inches.

Hab. N. India. In Museum East India Company.

Remark.—*Neptis Manasa* may be distinguished above by the discoidal streak being nearly confluent with the spot on the middle of the posterior margin, it being quite confluent on the under-side.

7. NEPTIS ANANTA, MOORE.

Neptis Ananta, Moore, Catal. Lep. Mus. E. I. C. i. p. 166. pl. 4 a. f. 3 (1857).

Neptis Ananta. Male.—Upper-side brownish-black; markings ferruginous; fore-wing with discoidal streak straight; a curved twice-interrupted band from anterior margin near apex to middle of posterior margin; a pale marginal line; hind-wing with rather broad inner and narrow outer band, both extending across the abdominal margin; also a pale marginal line and line between the bands. Under-side very deep ferruginous; fore-wing with discoidal streak, spots near apex and from posterior margin, ferruginous-white; posterior margin broadly patched with black; a marginal and submarginal bluish-ashy line; hind-wing with inner band white, outer band

grey and indistinct; a marginal line and zigzag line between the two bands bluish-ashy. Expanse $2\frac{1}{2}$ inches.

Hab. Simla; N.W. India. In Museum East India Company, and W. C. Hewitson, Esq.

Remark.—This species may be known from *N. Manasa* by its ferruginous markings and straight discoidal streak.

8. NEPTIS NARAYANA, Moore. (Pl. XLIX. f. 3.)

Neptis Narayana, n. sp. Male.—Upper-side black; markings white; fore-wing with the discoidal streak narrow; along costal margin towards the apex some narrow spots, with two large spots descending obliquely across the apex; a quadrate spot in middle of disc, and another on posterior margin; two submarginal narrow spots parallel with the quadrate discal spot; hind-wing with straight inner and narrower nearly straight outer band. Under-side glossy ferruginous, darkest about the middle of the wings, very pale at the base of costal margin, and blackish along posterior margin of the fore-wing; fore-wing with markings as above; hind-wing with submarginal line, zigzag line between the two bands, greyish-white. Expanse $2\frac{5}{8}$ inches.

Hab. N. India. In British Museum Collection.

Remark.—Allied to *Neptis Zaida*, but may be known from that and other allied species by the markings on the upper-side being pure white.

9. NEPTIS RADHA, Moore.

Neptis Radha, Moore, Catal. Lep. Mus. E. I. C. i. p. 166. pl. 4 a. f. 4 (1857).

Neptis Radha. Male.—Upper-side brownish-black; markings ferruginous; fore-wing with a long discoidal streak, narrow at base, and extending to a short distance between the third and second median veinlets; two small spots on costal margin, and two larger oblique spots near the apex; a large spot on disc, and an elongate spot to middle of posterior margin; marginal line pale; hind-wing with rather broad inner and narrower outer band, both extending across the abdominal margin; a marginal line and line between the two bands pale brown. Under-side ferruginous-brown; markings as above, but indistinct, owing to the surface being mottled over with ashy-blue. Expanse $2\frac{3}{4}$ inches.

Hab. Darjeeling; Bootan; N. India. In Museum East India Company.

10. NEPTIS ZAIDA.

♂ *Limenitis Zaida*, E. Doubleday, MS.

Neptis Zaida, Westwood in Doubleday and Hewitson's Diurnal Lep. p. 272. n. 9. t. 35. f. 3 (1850).

Hab. Simla; N.W. India. In Collection British Museum, and W. C. Hewitson, Esq.

Remark.—*Neptis Zaida* (the male *only* of which I am acquainted with) has the wings more rounded than in the other allied species, and on the hind-wing the inner band is very broad, the outer band narrow and *much curved*.

11. *NEPTIS AMBA*, Moore. (Pl. XLIX. f. 4.)

Neptis Amba, n. sp. Male.—Upper-side smoky-brown; markings white; fore-wing with long discoidal streak indented at the extremity of the cell; two oblique spots near the apex, and four reversely oblique spots to middle of posterior margin; an indistinct marginal and submarginal black line; hind-wing with rather broad inner band and narrow brownish-white outer band; marginal and submarginal line darker. Under-side dark ferruginous; markings as above; but the marginal and submarginal lines, base of costal margin, and streak near base of hind-wing also white.

Hab. Nepal (*General Hardwicke*). In Collection British Museum.

12. *NEPTIS VIKASI*, Horsfield.

Neptis Vikasi, Horsfield, Catalogue of Lep. Mus. E. I. C. (1829) t. 5. f. 2, 2a; Moore, Catal. Lep. Mus. E. I. C. i. p. 165.

Limenitis Vikasi, E. Doubleday, List Lep. Brit. Mus. pt. 1. p. 94.

Athyma Vikasi, Westwood in Doubleday and Hewitson's Diurnal Lep. p. 274. n. 10.

Hab. Java; Darjeeling; N. India. In most collections.

13. *NEPTIS COLUMELLA*. (Pl. XLIX. f. 5.)

Papilio Columella, Cramer, Pap. Exot. iv. t. 296. f. A, B (1782).

Limenitis Columella, E. Doubleday, List Lep. Brit. Mus. pt. 1. p. 95.

Neptis Columella, Westwood in Doubleday and Hewitson's Diurnal Lep. p. 272. n. 7; Moore, Catal. Lep. Mus. E. I. C. i. p. 166.

Acca Columena, Hübner, Verz. bek. Schmett. p. 44.

Hab. Darjeeling, N. India; China; Ceylon; and specimens from the Island of Lombok, which I have examined, are also identical. In Collection British Museum, East India Company, W.W. Saunders, Esq., and W. C. Hewitson, Esq.

14. *NEPTIS JUMBA*, Moore.

Neptis Jumba, Moore, Catal. Lep. Mus. E. I. C. i. p. 167. pl. 4 a. f. 5 (1857).

Neptis Jumba. Upper-side smoky-black; fore-wing with a narrow longitudinal streak, and a parallel triangular spot, white; a transverse curved row of interrupted white spots, from apical third of costal margin to near middle of posterior margin, composed of two very narrow longitudinal spots on the costal margin, beneath which are two large spots, then a very small streak, then two large spots, and lastly two narrower spots terminating on posterior margin; between this band of spots and exterior margin are two rows of more

or less defined lunular-shaped white spots, these being bounded exteriorly by a row of deep black; hind-wing with a broad white band from costal to abdominal margin, being intersected by the veins; near outer margin a row of ill-defined white lunulated marks, bounded exteriorly by deep black, then a submarginal row of black lines; between the white band and row of lunated white marks is a broad band of black. Under-side ferruginous; fore-wing with markings as above, but the four rows of markings along exterior margin white, and suffused at the apex and near the middle with ferruginous; hind-wing with the broad white band; abdominal margin, base of costal margin, and broadly across parallel with the band, suffused with white; a marginal and two submarginal rows of whitish marks, between which and the broad band is a series of fine dark ferruginous spots from abdominal margin, and terminating in white marks on costal margin. Body above black, beneath white. Sexes alike. Expanse $2\frac{3}{4}$ to $2\frac{1}{2}$ inches.

Hab. Darjeeling, N. India; Ceylon. In Museum East India Company, British Museum, and W. C. Hewitson, Esq.

15. NEPTIS HELIODORA.

Papilio Heliadora, Cramer, Pap. Exot. iii. t. 212. f. E, F (1782) (nec Fabr. 1793).

Acca Heliadora, Hübner, Verz. bek. Schmett. f. 44.

Nymphalis Helicopsis, Godart, Enc. Méth. ix. p. 431 (1819).

Athyma Helicopsis, Westwood in Doubleday and Hewitson's Diurnal Lep. p. 274. n. 3.

Hab. Moluccas; Amboyna (*Cramer*).

Remark.—I have not as yet seen any example of this species. It is allied to the following.

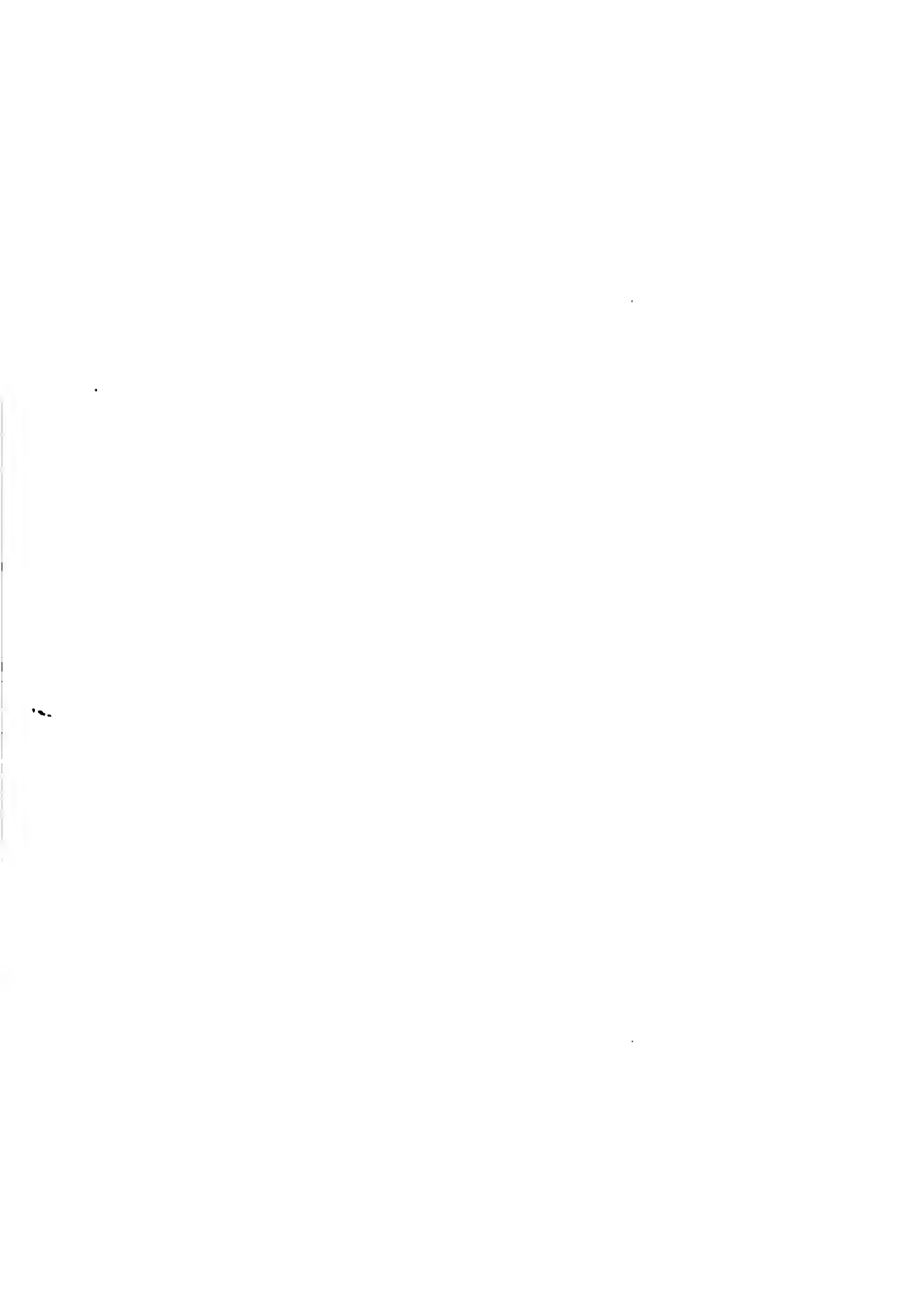
16. NEPTIS SHEPHERDI. (Pl. L. f. 1.)

Limenitis Shepherdii, Newman, MS.—Upper-side brownish-black; fore-wing, with discoidal streak in two portions, the first being indistinct, the second a triangular spot; oblique spots from costal margin near apex, two larger spots on middle of the disc, and an elongated spot and a small dot above it on posterior margin, a submarginal row of spots and second outer very indistinct row, white; hind-wing with broad white transverse band from near middle of anterior to middle of abdominal margin; marginal lines pale brown. Under-side ferruginous-brown, suffused in parts with paler brown; fore-wing with base of costal margin yellow; markings as above, but the first portion of discoidal streak more distinct, the discal spots somewhat smaller, and between marginal row of spots and outer margin are two rows of narrow white linear marks; hind-wing with transverse white band; three and an indistinct fourth row of narrow marginal lines; base of anterior margin and below costal vein whitish. Expanse $2\frac{3}{4}$ inches.

Hab. New South Wales, Australia. In Collection British Museum, W. W. Saunders, Esq., and W. C. Hewitson, Esq.



1 Neptis Shepherdii Newm. 2 Athyma Bahula. Moore. 3 A. Reta. Moore 4 A. Kresna. Moc
5 A. Nefte. 3♀. 6 A. Inara. 3♀Bd. 7 A. Abiasa. Moore.



17. NEPTIS SOMA, Moore. (Pl. XLIX. f. 6.)

Neptis Soma, n. sp.—Allied to, but differs from, *Neptis Nandina*, on the upper-side, in having the discoidal streak narrower, and the curved row of seven spots are much smaller, being only half their size, and are wider apart; the submarginal row of spots is also smaller; the bands on hind-wing are also narrower; on the under-side the colour is of a deep maroon, the markings as in upper-side, but those on the hind-wing less straight. Sexes alike. Expanse from $2\frac{3}{8}$ to $2\frac{5}{8}$ inches.

Hab. Silhet, N. India. In Collection British Museum, and W. C. Hewitson, Esq.

18. NEPTIS NANDINA, Moore.

Neptis Nandina, Moore, Catal. Lep. Mus. E. I. C. i. p. 168. pl. 4 a. f. 7 (1857).

Neptis Nandina.—Upper-side black; markings white; fore-wing with discoidal streak in two entire portions; the curved row of seven spots broadly interrupted; and a submarginal row of small less-defined spots; hind-wing with inner band, and narrow outer row of less-defined square spots; indistinct marginal line and line between the bands brown. Under-side deep chocolate-brown, with markings as above, but more defined and of a brighter colour; those of the hind-wing rather straight, except the marginal and submarginal lines, which are gently curved. Sexes alike. Expanse $2\frac{1}{4}$ to $2\frac{5}{8}$ inches.

Hab. Darjeeling, Assam, N. India; Java. In Museum East India Company, British Museum, and W. C. Hewitson, Esq.

Remark.—This species may be known from *Neptis Aceris* by the deep chocolate colour of the under-side, by the anterior margin of hind-wing being evenly arched to beyond the middle, and by all the markings on this wing being nicely and evenly curved, more evenly than is shown in the figure.

19. NEPTIS ACERIS.

Papilio Aceris, Esper, Ausl. Schmett, t. 81. cont. 31. f. 3, 4; t. 82. f. 1 (1785); Fabricius, Mant. Ins. ii. p. 52; *id.* Ent. Syst. iii. pt. 1. p. 245.

Nymphalis Aceris, Godart, Enc. Méth. ix. p. 430.

Acca Aceris, Hübner, Verz. bek. Schmett. p. 44.

Limenitis Aceris, Boisduval, Icon. Hist. t. 18. f. 2; *id.* Ind. Méth. p. 16; E. Doubleday, List Lep. Brit. Mus. pt. 1. p. 95; Kollar in Hügél's Kaschnir, iv. pt. 11. p. 428.

Neptis Aceris, Fabricius, Syst. Gloss. (Illiger's Mag. vi. p. 282); Horsfield, Catal. Lep. Mus. E. I. C. t. 7. f. 9; Westwood in Doubleday and Hewitson's Diurnal Lep. p. 271. n. 5; Moore, Catal. Lep. Mus. E. I. C. i. p. 168.

Papilio Plautilla, Hübner, Europ. Schmett. Pap. f. 99, 100 (1805).

Acca Matuta, Hübner, Verz. bek. Schmett. p. 44 (1816).

Neptis Matuta, Westwood in Doubleday and Hewitson's Diurnal Lep. p. 272. n. 6.

Papilio Leucothoë, Cramer, Pap. Exot. iv. t. 296. f. E, F (nec Linn.); Donovan, Ins. of China, 1st edit. t. 35. f. 3 (nec Linn.).

Limenitis Eurynome, Westwood in 2nd edit. Donovan's Ins. of China, p. 66. t. 35. f. 3.

Athyma Eurynome, Westwood in Doubleday and Hewitson's Diurnal Lep. p. 274. n. 2.

Hab. Germany; Hungary; South Russia; North-western, North-eastern, Central, and Southern India; Ceylon; China; Madjico Sima; Pinang, Malacca, Java, Borneo, Manilla. In most collections.

Remark.—After carefully examining a number of specimens of this species from all the localities above enumerated, I am enabled to say that I can detect no difference between the alleged species *Aceris*, *Matuta*, and *Eurynome*. Specimens measuring in expanse from $1\frac{1}{2}$ to $2\frac{1}{2}$ inches are obtained from the same locality, and the Chinese specimens are generally larger, some being $2\frac{1}{2}$ inches in expanse; those from the latter locality have been named *Eurynome* by Mr. Westwood, the *type*-specimen of which I have examined.

20. NEPTIS IDA, Moore. (Pl. XLIX. f. 7.)

Neptis Ida, n. sp.—Upper-side dusky brown; fore-wing with discoidal streak, and curved series of white spots as in *Neptis Aceris*; marginal, submarginal and third inner row of small white spots; hind-wing with broad inner band, and narrower outer row of widely separated spots, white; a marginal line of narrow whitish marks; line between the two bands pale brown. Under-side pale ferruginous, markings as above, all white and broader. Expanse $2\frac{1}{2}$ inches.

Hab. Celebes or Mindanao. In the Collection of W. W. Saunders, Esq., and W. C. Hewitson, Esq.

This beautiful species was recently brought home by Madame Ida Pfeiffer.

21. NEPTIS DURYODANA, Moore. (Pl. XLIX. f. 8.)

Neptis Duryodana, n. sp.—Differs from Bornean specimens of *Nep. Aceris*, in being of a much blacker colour on the upper-side, the markings also being much whiter; and in the under-side being brown, where the inner band of the hind-wing does not extend to the inner margin as in that species, and the marginal and submarginal lines are more curved. Expanse $2\frac{1}{2}$ inches.

Hab. Borneo. In collection of British Museum, and W. C. Hewitson, Esq.

22. NEPTIS NATA, Moore.

Neptis Nata, Moore, Catal. Lep. Mus. E. I. C. i. p. 168. pl. 4 a. f. 6 (1857).

Neptis Nata.—Upper-side deep black, markings very white; fore-wing with discoidal streak long, in two portions; curved series of spots small; hind-wing with the bands narrow. Under-side dusky brown; inner band of hind-wing not extended to anterior margin;

a marginal line only between outer band and exterior margin, the submarginal line being obsolete. Sexes alike. Expanse $2\frac{1}{2}$ inches.

Hab. Singapore and Borneo. In Collection East India Company, British Museum, W. W. Saunders, Esq., and W. C. Hewitson, Esq.

Genus *ATHYMA*, Westwood.

Athyma, Westwood in Doubleday and Hewitson's Diurnal Lep. p. 272 (1850).

Acca, pt., Hübner, Verz. bek. Schmett.

Biblis, pt., Fabricius, Syst. Gloss.; Horsfield, Catal. Lep. Mus. E. I. C. (1829).

Limenitis, pt., E. Doubleday, List Lep. Brit. Mus.

1. *ATHYMA LEUCOTHOË*.

Papilio Leucothoë, Linnæus, Mus. Lud. Ulr. 292; *id.* Syst. Nat. ed. 12. ii. p. 780; Fabricius, Ent. Syst. iii. pt. 1. p. 129; Sulzer, Hist. Ins. t. 18. f. 2, 3.

Nymphalis Leucothoë, Godart, Enc. Meth. ix. p. 430.

Acca Leucothoë, Hübner, Verz. bek. Schmett. p. 44.

Biblis Leucothoë, Horsfield, Catal. Lep. Mus. E. I. C. t. 8. f. 3.

Limenitis Leucothoë, Westwood in Donovan's Ins. of China, 2nd edit. t. 35. f. 4; Kollar in Hügel's Kaschmir, iv. pt. 11. p. 428; E. Doubleday, List Lep. Brit. Mus. pt. 1. p. 94.

Athyma Leucothoë, Westwood in Doubleday and Hewitson's Diurnal Lep. p. 273; Moore, Catal. Lep. Mus. E. I. C. i. p. 170.

Papilio Eriosine, Cramer, Pap. Exot. iii. t. 203. f. E. F.

Najas hilaris Erosine, Hübner, Samml. Exot. Schmett. Band.

Papilio Polyxena, Donovan, Ins. of China, 1st edit. t. 35. f. 4 (1798).

Hab. N. India; China; Java; Sumatra. In most collections.

Remark.—The specimens of *Athyma Leucothoë* from Java are generally smaller than those from India, and have the central band broader and the portions closer together. Sexes alike.

2. *ATHYMA OPALINA*.

Lymanitis opalina, Kollar in Hügel's Kaschmir, iv. pt. 2. p. 427 (1844).

Athyma opalina, Westwood in Doubleday and Hewitson's Diurnal Lep. p. 274. n. 5; Moore, Catal. Lep. Mus. E. I. C. i. p. 171. pl. 5 a. f. 2.

Hab. Darjeeling; Masuri (*Kollar and Hearsey*). In Collection East India Company, British Museum, W. W. Saunders, Esq., and W. C. Hewitson, Esq.

Remark.—This species may be distinguished by the discoidal streak being divided into four portions, as in *Athyma Leucothoë*, and by the deep ferruginous colour of the under-side being suffused

in parts with grey and greyish brown. Expanse $2\frac{1}{2}$ to $2\frac{1}{2}$ inches. Sexes alike.

3. *ATHYMA BAHULA*, Moore. (Pl. L. f. 2.)

Athyma Bahula, n. sp.?—Allied on the upper-side to *Athyma opalina*, and, like that species, on the fore-wing has the discoidal streak divided into four portions, but which differs in being narrow and the terminal portion being much elongated, whereas in *A. opalina* this portion is short; it has also a distinct submarginal row of linear spots; the bands are also narrower throughout; on the under-side this species differs in the fore-wing in having the portions of the discoidal streak divided by a blackish line, and a distinct marginal and submarginal row of spots; space between the markings blackish; on the hind-wing between the curved precostal streak and inner band are some short blackish lines: in *Ath. opalina*, on the inner band from the middle of its lower margin, there is a descending greyish portion to abdominal margin, whereas in *Ath. Bahula* this is wanting; space between the two bands with blackish patches; a distinct marginal row of linear spots. Expanse $2\frac{1}{2}$ to $2\frac{1}{2}$ inches. Sexes alike.

Hab. Sylhet. In British Museum Collection, and W. C. Hewitson, Esq.

4. *ATHYMA LARYMNA*.

Limenitis Larymna, E. Doubleday, MS.

Athyma Larymna, Westwood in Doubleday and Hewitson's Diurnal Lep. p. 274. n. 7. t. 35. f. 1 (1850); Moore, Catal. Lep. Mus. E. I. C. i. p. 172.

Hab. Borneo. In Collection East India Company, British Museum, and W. W. Saunders, Esq.

Remark.—In this fine species, recently sent home by Mr. Wallace, the sexes are alike.

5. *ATHYMA RETA*, Moore. (Pl. L. f. 3.)

Athyma Reta, n. sp.—Allied to, but differs from *Ath. Kresna* in having the discoidal streak somewhat narrower, the three oblique spots near the apex and the three to the posterior margin much larger, there also being a small spot between these two series; marginal lines very indistinct; bands on the hind-wing rather broad; markings of the under-side as in above. Expanse $2\frac{1}{2}$ inches.

Hab. Sumatra (*Raffles*). In the collections of Dr. Horsfield and W. C. Hewitson, Esq.

6. *ATHYMA KRESNA*, Moore. (Pl. L. f. 4.)

Athyma Kresna, n. sp. Male.—Upper-side blackish-brown; fore-wing with discoidal streak in three portions, the third portion largest and triangular; an oblique transverse row of three spots near the apex; a large spot in middle of disc, and two smaller spots on middle of posterior margin, bluish-white; a submarginal row of

small ill-defined whitish spots; hind-wing with inner band and narrower outer row of spots, bluish-white; a narrow marginal line to both wings, light brown. Under-side brown, with markings as above, but all less defined, except the marginal line, which is whitish. Expanse $2\frac{3}{4}$. Body with collar and band across abdomen white.

Hab. Borneo; Sumatra. In Collection British Museum.

Allied to *Ath. Larymna*, Dbl., but distinguished by its smaller size and white markings, the discoidal streak in that species being in *four* portions.

7. *ATHYMA NEFTE*. (Pl. L. f. 5.)

♀ *Papilio Nefte*, Cramer, Pap. Exot. iii. t. 256. f. E. F. (1782).

Pantoporia Nefte, Hübner, Verz. bek. Schmett. p. 44.

Nymphalis Nefte, Godart, Enc. Meth. ix. p. 429.

Limenitis Nefte, Boisduval, Spec. Gen. Lep. t. 8 (4 B.). f. 6; E. Doubleday, List Lep. Brit. Mus. pt. 1. p. 93.

Athyma Nefte, Westwood in Doubleday and Hewitson's Diurnal Lep. p. 274. n. 11; Moore, Catal. Lep. Mus. E. I. C. i. p. 173.

Hab. Java; Borneo. In Museum East India Company, British Museum, W. W. Saunders, Esq., and W. C. Hewitson, Esq.

Remark.—The male of *Athyma Nefte* has all the markings of the upper-side white, these in the female being orange-coloured.

8. *ATHYMA ASITA*, Moore.

Anthyma Asita, n. sp. Male.—Differs from *Ath. Inara* on the upper-side of the fore-wing in having the basal portion of the discoidal streak white; the submarginal row of spots being ferruginous at the apex of the wing only, the rest being white; and on the hind-wing in having both bands white. Under-side with markings coloured as in upper-side. Expanse $2\frac{3}{4}$ inches.

Hab. Unknown, probably N. India. In Collection of W. W. Saunders, Esq.

Remark.—This species is intermediate between *Athyma Nefte* and *Ath. Inara*. Female unknown.

9. *ATHYMA INARA*. (Pl. L. f. 6.)

♂ *Limenitis Inara*, E. Doubleday, MS.

♂ *Athyma Inara*, Westwood in Doubleday and Hewitson's Diurnal Lep. p. 274. t. 34. f. 3 (1850); Moore, Catal. Lep. Mus. E. I. C. i. p. 173.

Hab. Darjeeling, N. India. In Collection East India Company, British Museum, W. W. Saunders, Esq., and W. C. Hewitson, Esq.

Remark.—The female of *Athyma Inara* has all the markings on the upper-side orange colour, as in that sex of *Ath. Nefte*.

10. *ATHYMA SUBRATA*, Moore. (Pl. LI. f. 1.)

Athyma Subrata, n. sp. Female.—Upper-side deep brown, with the markings disposed as in the female of *Athyma Nefte*; but they are all narrower, and instead of being of a deep orange colour, are

suffused with very pale brown. The under-side is also much darker, being of a light smoky-brown, with all the markings white. Expanse $2\frac{1}{2}$ inches.

Hab. Malacca, Sumatra. In Collection British Museum, and W. W. Saunders, Esq.

11. *ATHYMA CAMA*, Moore.

Athyma Cama, Moore, Catal. Lep. Mus. E. I. C. i. p. 174. pl. 5 a. f. 5 ♂ ♀ (1857).

Athyma Cama. Male.—Upper-side velvety-black; fore-wing with a brown marginal and submarginal line; discoidal streak indistinct, ferruginous, and dusted over with black; near the apex a ferruginous spot; two oblique spots from subcostal vein on one-third of the wing from the apex, and a band of three spots from middle of wing to posterior margin, joining a band across the hind-wing, white, bordered with blue; on the hind-wing also a marginal and submarginal brown line. Body black, with a broad white band across base of abdomen, also a pale ferruginous line across the thorax. Under-side pale ferruginous, markings purplish-white; the curved band as above; fore-wing with a long broad irregular discoidal streak, a submarginal and indistinct marginal line; a black patch near the base of wing, and another near posterior angle; hind-wing with a curved line near base of wing, and a rather broad outer band, a marginal row of marks; some patches of brown between outer and inner band. Body and abdominal margin broadly grey.

Female.—Upper-side black; markings ferruginous; fore-wing with a long discoidal streak; an oblique band from anterior to near middle of exterior margin, and nearly joining a band running to middle of posterior margin; a marginal and submarginal brown line, the latter ferruginous anteriorly and posteriorly; hind-wing with a broad inner and narrower outer band; also a marginal brown line. Body black, with a white band across the base of abdomen, and tinged below the band with ferruginous; also a pale white collar. Under-side ferruginous; markings as in the male, but pinky-white, except marginal and submarginal lines, which are purplish-white. Expanse of wings in male $2\frac{1}{2}$ to $2\frac{3}{4}$ inches, female 3 inches.

Hab. Darjeeling, N. India. In Museum East India Company, and W. C. Hewitson, Esq.

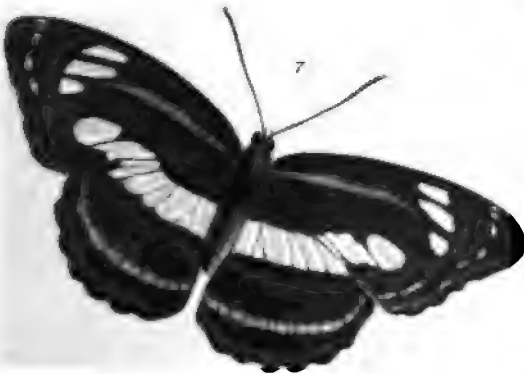
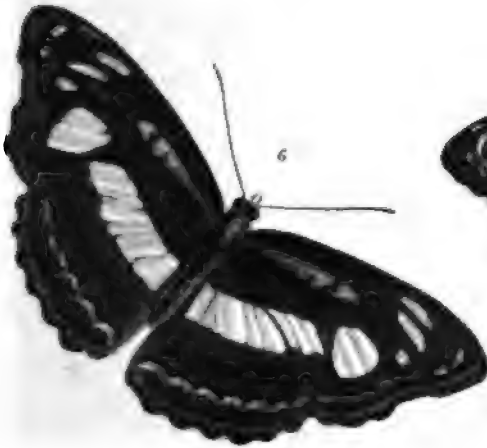
Remark.—The male of *Athyma Cama* may at once be known from that sex of *Ath. Selenophora* in having on the upper-side a ferruginous spot close to the apex, and the band on the fore-wing being composed of three spots.

12. *ATHYMA SELENOPHORA*.

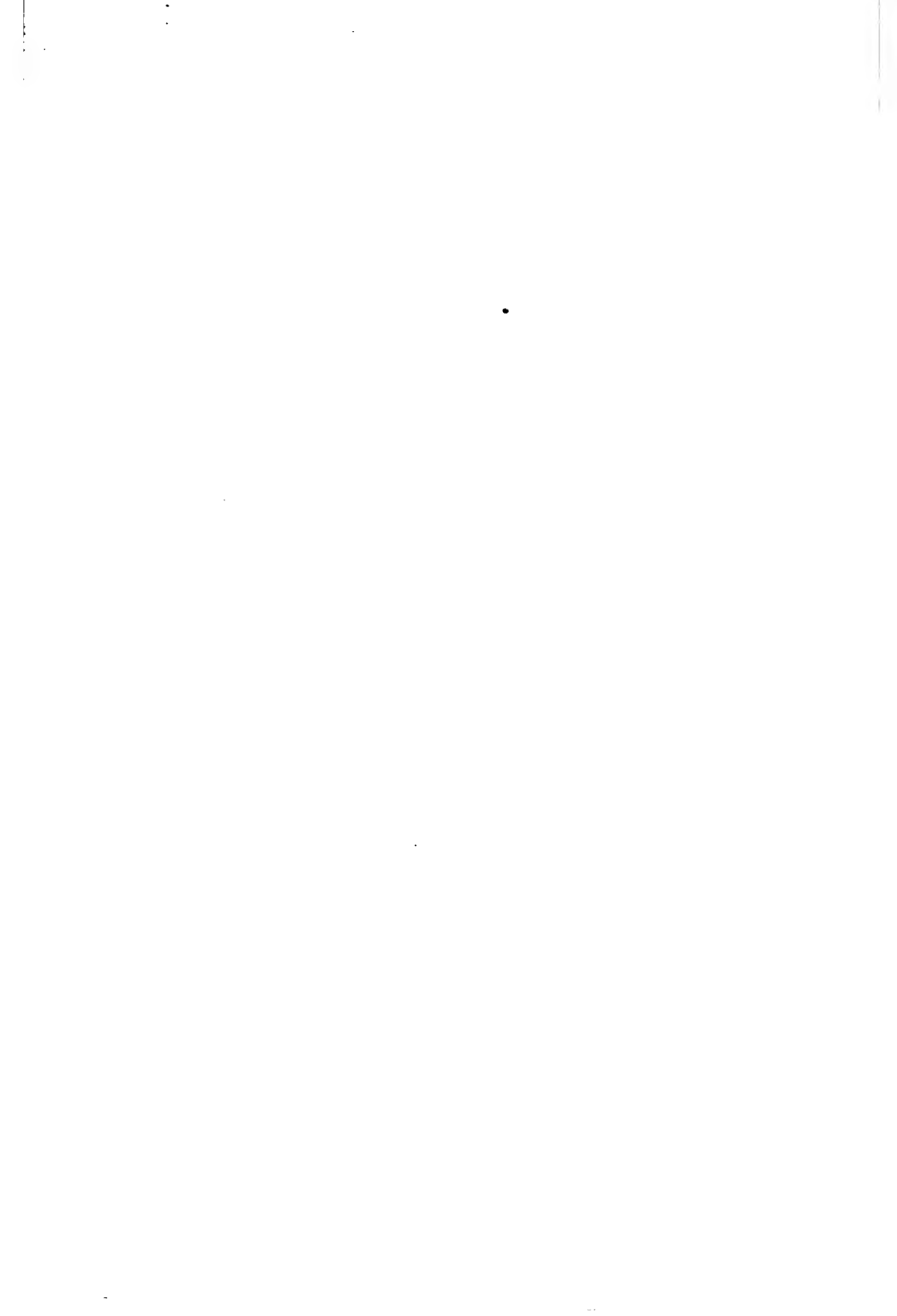
♂ *Limenitis Selenophora*, Kollar in Hügel's Kaschmir, iv. pt. 11. p. 426. t. 7. f. 1, 2 (1844); Westwood in Doubleday and Hewitson's Diurnal Lep. p. 276. n. 8.

Athyma Selenophora, Moore, Catal. Lep. Mus. E. I. C. i. p. 175.

Hab. Masuri (Kollar); Darjeeling. In Collection East India



1. *Athyma Subrata* 9. Moore 2. *A. Kanwa* Moore 3. *A. Idita* Moore 4. *A. Illigera* Esch
5. *A. Dama* Moore 6. *A. Kasa* 7. *A. Gutama* Moore.



Company, British Museum, W. W. Saunders, Esq., and W. C. Hewitson, Esq.

Remark.—The male of this species may be distinguished from *Ath. Cama* on the upper-side by having the oblique subapical spots narrower, and the band on the fore-wing being composed of four spots; in the under-side being of a darker ferruginous colour, and the streak along discoidal cell being divided into four portions, and in having darker black blotches; also in having on the hind-wing four short black lines disposed between the inner band and discoidal vein. Expanse of male $2\frac{1}{4}$ inches. Female unknown, but would have the markings above ferruginous.

13. *ATHYMA RANGA*, Moore.

Athyma Ranga, Moore, Catal. Lep. Mus. E. I. C. i. p. 175. pl. 5 a. f. 6 (1857).

Athyma Ranga.—Upper-side smoky-black; fore-wing with a curved interrupted white band from anterior margin, one-third from the apex, to middle of posterior margin, being composed of eight spots, the first on anterior margin very narrow, second, third and fourth elongate conical, the fourth being the shortest; fifth triangular and broadly divided from the fourth; sixth broad, largest, and nearly square; seventh narrower and broadly divided from the sixth; and eighth long and narrow; a marginal and submarginal row of rather indistinct whitish spots; base of wing covered with indistinct white spots; hind-wing with broad inner band, intersected by the veins; an outer or submarginal row of broad conic-shaped indistinct white spots; a marginal row of very indistinct spots, also indistinct spots at the base of wing; abdominal margin whitish. Body dark brown: abdomen with two rows of small white spots. Under-side with the markings the same and very distinct; body and abdominal margin greenish-white. Expanse $2\frac{3}{4}$ inches. Sexes alike.

Hab. Darjeeling. In Museum East India Company, British Museum, W. W. Saunders, Esq., and W. C. Hewitson, Esq.

14. *ATHYMA MAHESA*, Moore.

Athyma Mahesa, Moore, Catal. Lep. Mus. E. I. C. i. p. 176. pl. 5 a. f. 7 (1857).

Athyma Mahesa. Male.—Upper-side smoky-black; fore-wings with a green gloss in some lights; fore-wing with three white ovate spots obliquely from subcostal vein one-third from the apex; two white spots in middle of the wing, the upper one very small, and two white spots on middle of posterior margin, the upper oval, the lower narrow; two indistinct white spots in discoidal cell, and some indistinct greenish spots at the base of the wing; a marginal and submarginal row of light brown spots; hind-wing with an inner white band, divided by the veins, and an outer or submarginal row of indistinct brownish-white conic-shaped spots; also a very indistinct marginal row of small light brown spots. Body brown; abdomen

with two rows of white spots. Under side paler, tinged with ferruginous about the disc; markings the same, but all very distinct, and more or less white; the spots within discoidal cell and base of fore-wing divided by black marks; base of costal margin yellowish-white; hind-wing with space between precostal and costal vein yellowish-white; a curved oval black mark, whitish within, between the costal vein and inner band; a row of black patches between inner and outer band. Body and broadly on abdominal margin yellowish-grey. Expanse $2\frac{1}{4}$ inches.

Hab. Darjeeling. In Museum East India Company, and Hopeian Collection at Oxford.

Remark.—This species may be known from *Athyma Ranga* by its larger size and much narrower band.

15. *ATHYMA ABIASA*, Moore. (Pl. L. f. 7.)

Athyma Abiasa, n. sp. Male.—Upper-side black; markings bluish-white; fore-wing with an indistinct narrow streak from base, and a large spot near extremity of the discoidal cell; an indistinct narrow transverse disco-cellular line; three spots obliquely from subcostal vein one-third from the apex, the third spot being minute; two spots in middle of the disc, the upper one small, the lower very large, also a large spot on middle of posterior margin; also a submarginal row of very small whitish spots; hind-wing with rather broad inner band, and outer row of recurved small triangular spots; an indistinct brown marginal line. A band of white across base of abdomen. Under-side dusky-brown, marked as above, with the marginal lines plainer. Expanse 2 inches.

Hab. Java. In British Museum Collection.

16. *ATHYMA IDITA*, Moore. (Pl. LI. f. 3.)

Athyma Idita, n. sp. Male.—Upper-side blackish-brown; markings bluish-white; fore-wing with the discoidal streak in two portions, the first narrow, the second somewhat round; from subcostal vein curving to middle of posterior margin a series of seven spots, the upper two oval, rather long, the third the smallest, fourth larger, the third and fourth widely separated from second and fifth, fifth largest, nearly round, outwardly oblique, sixth and seventh irregularly shaped; a submarginal row of narrow indistinct marks, that at the posterior angle being largest; hind-wing with inner band, and narrow row of six rather square spots curving upward and outward from near abdominal angle, the last spot near anterior angle centred with a dark brown dot. Front of thorax beautifully variegated with ferruginous, green, brown and blue; base of abdomen with broad bluish-white band. Under-side very deep ferruginous; fore-wing having the discoidal streak with black transverse margins and an ill-defined third portion: curved row of spots as above; a submarginal row of large white, black-centred spots; a submarginal and marginal line of white marks; some dusky patches along posterior margin; the large portion of the discoidal streak and submarginal row

of spots with purple reflexions; hind-wing with curved streak near the base, inner band, outer row of recurved spots, submarginal line of lunular marks, and marginal row of spots, white; abdominal margin greyish. Expanse $2\frac{1}{2}$ inches.

Hab. Java? In the Collection of the British Museum, Dr. Horsfield, and J. O. Westwood, Esq.

17. *ATHYMA KANWA*, Moore. (Pl. LI. f. 2.)

Athyma Kanwa, n. sp. Female.—Upper-side brown-black; fore-wing with discoidal streak in two portions, the first long, slightly clavate, the second large and triangular; two small oval oblique spots near the apex, the two outer the smallest; a round spot in middle of the disc, and a spot and a dot on middle of posterior margin; an ill-defined submarginal row of narrow marks, white; hind-wing with inner and outer narrow band, white, divided by the veinlets; also an indistinct pale brown submarginal line. Under-side paler, with darker patches between the veins; markings as above. Body with two transverse bluish-white bands. Expanse $2\frac{3}{8}$ to $2\frac{1}{2}$ inches.

Hab. Borneo. In Collection British Museum, and East India Company.

18. *ATHYMA ASURA*, Moore.

Athyma Asura, Moore, Catal. Mus. E. I. C. i. p. 171. pl. 5 a. f. 1 (1857).

Athyma Asura.—Upper-side smoky-brown; markings creamy-white; fore-wing with a narrow discoidal streak, which is terminated at a short distance by an angular mark; a band of spots curving outwards from anterior to middle of posterior margin, the first spot commencing as a very narrow line, second and third long and oval, fourth the smallest, fifth somewhat larger and rounded, sixth larger still and oval, seventh the largest, square, indented at the side, eighth narrow and on posterior margin; a submarginal row of well-defined lunular marks, terminated on the apex of the wing by an inner row of three small spots; hind-wing with a broad inner band, also a less broad band from abdominal to anterior angle, this being intersected by the veinlets, and having a single black spot in the middle between each veinlet; marginal line in both wings pale brown. Body with a narrow bluish-white collar and band across the base of the abdomen. Under-side bright ferruginous; markings as above, but the fore-wing has the submarginal row of marks broad, and having a black spot in the middle of each; also a marginal row of small spots; some black lines bordering the discoidal marks, also a small black circle near base of wing, and a patch of black on posterior margin near the angle; hind-wing with the inner and spotted outer band the same as above; a bluish-green curved line across the base of wing, and a marginal row of lunular spots. Body and upper part of abdominal margin bluish-green. Sexes alike. Expanse 3 inches.

Hab. N. India. In Collection India House, British Museum, W. W. Saunders, Esq., W. C. Hewitson, Esq., and Hopeian Museum at Oxford.

Remark.—This species may be distinguished from all others by the outer band on the hind-wings having a central spot between each vein.

19. *ATHYMA SULPITIA*.

Papilio Sulpitia, Cramer, Pap. Exot. iii. t. 214. f. E. F (1782), nec Fabr.

Acca Sulpitia, Hübner, Verz. bek. Schmett. p. 44.

Nymphalis Strophia, Godart, Enc. Méth. ix. f. 431 (1819).

Athyma Strophia, Westwood in Doubleday and Hewitson's Diurnal Lep. p. 274. n. 4.

Hab. China. In Collection W. W. Saunders, Esq., and W. C. Hewitson, Esq.

20. *ATHYMA SANKARA*.

Limenitis Sankara, Kollar in Hügel's Kaschmir, iv. pt. 11. p. 428 (1844).

Hab. Masuri, N. W. India (*Kollar*).

Remark.—We have been unable to identify this species from the description by Kollar.

21. *ATHYMA JINA*, Moore.

Athyma Jina, Moore, Catal. Lep. Mus. E. I. C. i. p. 172. pl. 5a. f 3 (1857).

Athyma Jina. Male. — Upper-side smoky-brown; markings creamy-white; fore-wing with the discoidal streak *entire*, long, broad and thickening to the extremity; a series of seven spots from subcostal vein, curving outward to middle of posterior margin, the first being small, second larger, broader, third narrow, fourth small, fifth larger, oval, sixth the largest, somewhat square and indented at the side, seventh narrow, elongated, triangular; a submarginal row of rather indistinct spots, those on the apex broadest; hind-wing with inner band somewhat narrow; outer band composed of broad lunulated spots. Band at the base of the abdomen whitish. Under-side brilliant ferruginous, posterior margin of the fore-wing blackish; markings the same as above, but the fore-wing with an additional spot on costal margin to the curved row; extreme exterior margin blackish, bounded inwardly by a submarginal row of white lines; hind-wing with the inner band extending across abdominal margin; space between base of wing and costal vein white; extreme exterior margin blackish, bounded inwardly by a marginal row of narrow lunular marks. Body white. Expanse 3 inches.

Hab. Darjeeling, N. India. In Museum East India Company.

Remark.—This species may at once be distinguished by the discoidal streak being *entire*.

22. *ATHYMA PRAVARA*, Moore.

Athyma Pravera, Moore, Catal. Lep. Mus. E. I. C. i. p. 173. pl. 5 a. f. 4 (1857).

Athyma Pravera.—Upper-side smoky-brown, markings creamy-white; fore-wing with an *entire* club-shaped streak; a transverse row of spots curving outward from costal vein towards the apex, to middle of posterior margin, the first and second spot being rather large and square, the third much smaller, the fourth a mere dot, the fifth the largest and oval, the sixth large and indented at the sides, the last narrow; a row of submarginal linear-shaped spots, more or less distinct; hind-wing with a broad inner band, and a narrow band of spots curving outwardly from anal angle to anterior angle; a submarginal line and abdominal margin light brown. Body with a narrow bluish-white band across the thorax, and another across the base of the abdomen. Under-side paler brown, with markings as above, but with dark-brown patches between the markings. Body and abdominal margin greyish. Sexes alike. Expanse $2\frac{1}{2}$ inches.

Hab. Java; Borneo. In Museum East India Company, and W. C. Hewitson, Esq.

23. *ATHYMA ILLIGERA*. (Pl. LI. f. 4.)

Limenitis Illigera, Escholtz in Kotzebue's Voy. t. 8. f. 17.

Neptis Illigera.—Upper-side brown-black; fore-wing with ill-defined brownish-white entire discoidal streak; a large spot crossed by a vein in middle of the disc, and a small spot on middle of posterior margin, white; also several transverse series of small white spots at the apex; hind-wing with a broad white inner band; an indistinct narrower outer band, marginal line and line between the bands, pale brown. Under-side as above, with all the markings white. Sexes alike. Expanse $2\frac{1}{2}$ inches.

Hab. Manilla. In collection British Museum, W. W. Saunders, Esq., and W. C. Hewitson, Esq.

24. *ATHYMA DAMA*, Moore. (Pl. LI. f. 5.)

Athyma Dama, n. sp. Female.—Upper-side brown-black; fore-wing with narrow straight line within discoidal cell, and a parallel large longitudinally oval spot white, the narrow line tinged at the base with yellow; two small subapical spots, a larger spot on lower part of disc, and two narrow spots on posterior margin, white; an ill-defined brownish-white marginal and submarginal spotted line; hind-wing with broad white inner band, and a narrow outer band, marginal line, and line between the bands, pale brown. Under-side as above, but tinged with ferruginous; all the markings white. Expanse $1\frac{3}{10}$ inch.

Hab. Manilla. In collection of W. W. Saunders, Esq., and W. C. Hewitson, Esq.

25. *ATHYMA KASA*, Moore. (Pl. LI. f. 6.)

Athyma Kasa, n. sp. Female.—Upper-side smoky brown; fore-

wing with ill-defined whitish discoidal streak, in three portions ; from costal margin near the apex three narrow spots, oblique ; in middle of disc two large spots, and two on middle of posterior margin, broad, white ; an indistinct marginal and submarginal pale brown line, the latter anteriorly spotted with white ; hind-wing with broad white inner band, and very narrow line of whitish lunulate marks, bounded above with a lunular black spot ; an indistinct black line between the band and the latter ; an indistinct pale brown marginal line. Under-side ochreous-red, with darker margins, markings as above, the interstices with patches of black ; spots at base of wings, and row of spots within the outer band and another row between the two bands of the hind-wing, black ; marginal lines white. Abdominal margin and body greenish-grey. Expanse 3 inches.

Hab. Philippine Islands. In British Museum Collection.

26. *ATHYMA GUTAMA*, Moore. (Pl. LI. f. 7.)

Athyma Gutama, n. sp. Female.—Upper-side smoky-black ; fore-wing with ill-defined brownish-white discoidal streak, straight, entire ; three oblique spots from costal margin near the apex, and three to the middle of posterior margin, white, the first of the latter being large and oval, the second square, the third narrow ; an ill-defined margin and submarginal brownish-white lines, the submarginal anteriorly being spotted with white ; hind-wing with broad white inner band, and narrow brownish-white outer band ; marginal line and line between the band brownish. Under-side rather paler, with markings as in upper-side, but more defined and all white, except the line between the bands of the hind-wing and an irregular line outside the oblique spots of the fore-wing, which are ochreous. Expanse $2\frac{3}{4}$ inches.

Hab. Manilla ; Philippine Isles. In collections of the British Museum, and W. W. Saunders, Esq.

27. *ATHYMA VENILIA*.

Papilio Venilia, Linnæus, Syst. Nat. ed. 10. n. 120 (1767) ; Clerck, Icon. t. 32. f. 4 ; Fabricius, Ent. Syst. iii. 1, p. 134 ; Cramer, Pap. Exot. iii. t. 219. f. B. C.

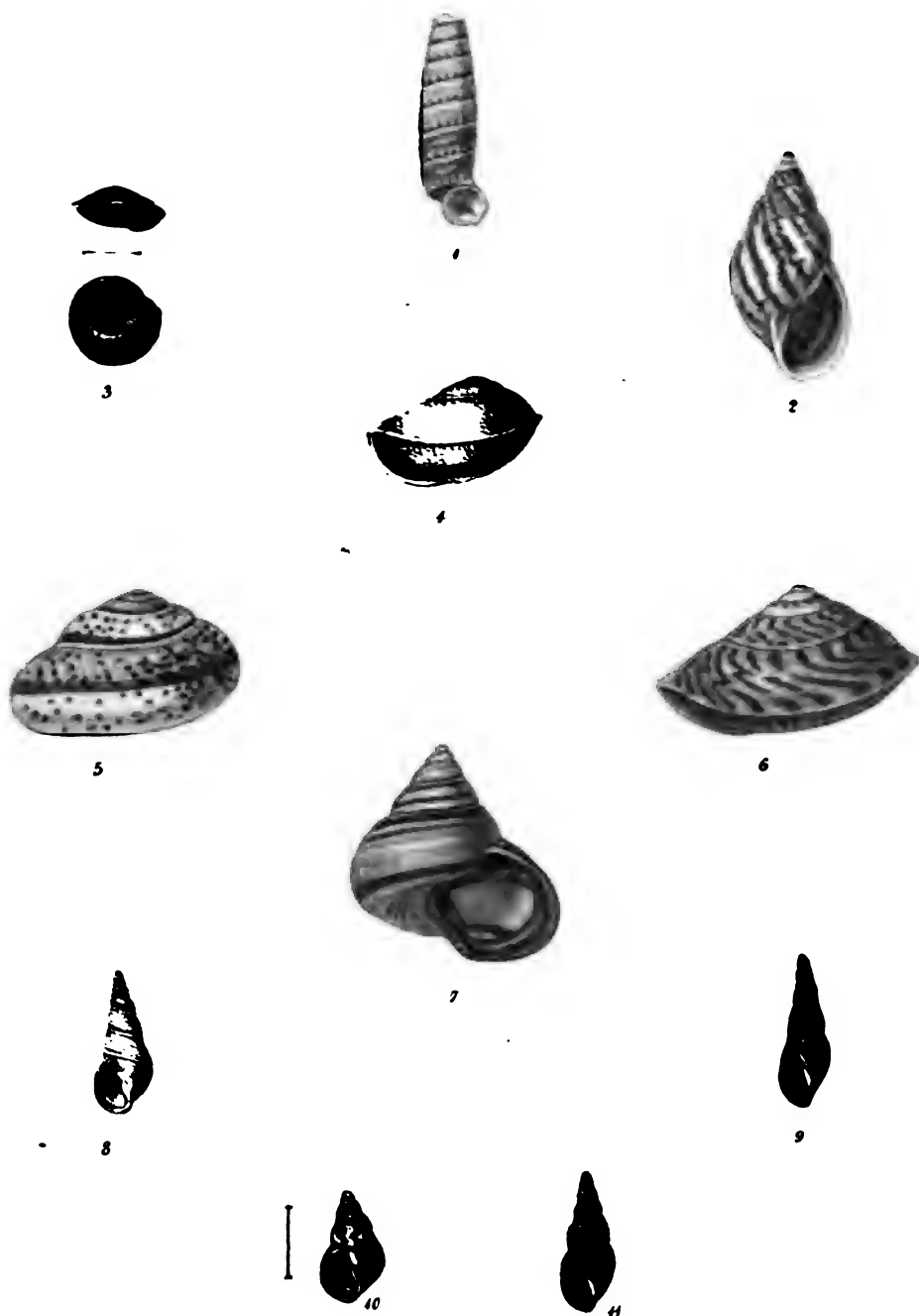
Nymphalis Venilia, Godart, Enc. Meth. ix. p. 433.

Hab. Java ; Ceram or Amboyna (*Madame Pfeiffer*). In collection British Museum, W. W. Saunders, Esq., and W. C. Hewitson, Esq.

3. DESCRIPTIONS OF ELEVEN NEW SPECIES OF LAND-SHELLS,
FROM THE COLLECTION OF H. CUMING, ESQ. BY DR. L.
PFEIFFER.

(Mollusca, Pl. XL.)

1. *HELIX WALLACEI*, Pfr. *T. subperforata, subconoideo-depressa, solidula, leviter striata, pallide isabellina, fusco-unizonata et*



1. *Cylindrella eximia*, 2. *Bulmus Mariae*,
 3. *Helix* ~~Erickii~~, 4. *H. Purchasi*, 5. *H. Wallacei*,
 6. *H. testudo*, 7. *H. congerua*, 8. *Achatmeila gemma*,
 9. *A. cinnamomea*, 10. *A. minuscula*, 11. *A. sulcata*.

punctis pellucidis nigricantibus conspersa; spira convexa, vertice subtili, prominulo; sutura albo-marginata; anfr. 5 viz convexiusculi, regulariter accrescentes, ultimus antice deflexus, basi pallidior, obsolete spiraliter sulcatus; apertura obliqua, late lunariovalis, intus saturate castanea; perist. rectum, marginibus remotis, columellari ad perforationem in laminam triangularem reflexo.

Diam. maj. 31, min. $26\frac{1}{2}$, alt. 17 mill.

β. Minor, punctis pellucidis pallidis, apertura intus alba, castaneo-unifasciata.

Hab. Macassar (Mr. Wallace).

2. *HELIX TESTUDO*, Pfr. *T. imperforata, trochiformis, solidula, striatula et rugis obliquis decussata, pallide isabellina, maculis et flammis fuscis picta; spira conoidea, acutiuscula; sutura carinato-marginata; anfr. 5 convexiusculi, regulariter accrescentes, ultimus acute carinatus, superne tumidus, antice viz deflexus, basi subplanulatus; apertura perobliqua, rhombo-lunaris; perist. albidum, margine supero expanso, basali reflexo, columellari lato, planato, adnato.*

Diam. maj. 35, min. 28, alt. 17 mill.

Hab. Madagascar.

3. *HELIX CONGRUA*, Pfr. *T. imperforata, trochiformis, solidula, striatula, carnea, fasciis fuscis varie picta; spira subconcavoconica, apice obtusiuscula; anfr. 6 convexiusculi, ultimus irregulariter inflatus, viz descendens, distinctius costulato-striatus, basi planiusculus, nitidior; apertura diagonalis, subtetragono-ovalis; perist. nigro-castaneum, expansum, extus striga lateritia cinctum, marginibus callo nigricante junctis, dextro dilatato, columellari lato, complanato.*

Diam. maj. 29, min. 25, alt. 24 mill.

Hab. Admiralty Islands (Dr. Purchas).

4. *HELIX PURCHASI*, Pfr. *T. imperforata, globoso-depressa, tenuissima, confertissime plicatula et sub lente subdecussata, æneomicans, pellucida, pallide cornea; spira breviter conoidea, obtusa; sutura marginata; anfr. viz $3\frac{1}{2}$ planiusculi, rapide accrescentes, ultimus non descendens, medio carina compressa, acuta, alba munitus, subtus inflatus, basi gibbosus; apertura ampla, obliqua, late angulato-lunaris; perist. tenue, breviter reflexum, margine columellari arcuato, compresso, subcalloso, juxta foveam centralem non dilatato.*

Diam. maj. 23, min. $17\frac{1}{4}$, alt. $13\frac{3}{8}$ mill.

Hab. Admiralty Islands (Dr. Purchas).

5. *HELIX FRICKI*, Pfr. *T. late umbilicata, lentiformis, tenuiuscula, striata, corneo-lutescens, strigis et maculis rufis ornata; spira breviter conoidea; sutura marginata, subexcavata; anfr. 7 plani vel concaviusculi, ultimus subdeflexus, acute carinatus, circa um-*

bilicum ($\frac{1}{2}$ diametri superantem) tumidulus; apertura obliqua, securiformis, ringens; lamellis 2 in pariete aperturali, nulla in margine columellari, 4 minoribus in basali, 1 in supero; perist. rectum, acutum.

Diam. maj. 8, min. $7\frac{1}{2}$, alt. 3 mill.

Hab. Sandwich Islands (Dr. Frick).

Differt ab H. lamellosa, Fér., sculptura, umbilico lato et deficiente plica columellari.

6. ACHATINELLA (NEWCOMBIA) CINNAMOMEA, Pfr. *T. imperforata, sinistrorsa, fusiformi-turrita, solidula, opaca, longitudinaliter plicatula, spiraliter sublirata et brevissime granulata, cinnamomea; spira elongata, subrectilinearis, apice acutiuscula; sutura subsimplex; anfr. 6 vix convexiusculi, superi fusco et albido marmorati, ultimus $\frac{2}{3}$ longitudinis subæquans, infra medium attenuatus, castaneus; columella simplex, recedens; apertura parum obliqua, semiovalis, basi subangulata; perist. simplex, rectum, acutum.*

Long. 19, diam. 5 mill.; ap. $7\frac{1}{2}$ mill. longa, 3 lata.

Hab. Sandwich Islands (Dr. Frick).

7. ACHATINELLA (NEWCOMBIA) GEMMA, Pfr. *T. subimperfurata, sinistrorsa, oblongo-turrita, solidiuscula, striatula et spiraliter lirata (liris planiusculis, conferte sulcatis), alba; spira turrita, apice acutiuscula; sutura submarginata; anfr. 7, superi plani, obsolete fusco-variegati, sequentes convexiusculi, ultimus $\frac{2}{3}$ longitudinis subæquans, medio lira acutiore subcarinatus; columella leviter plicata; apertura parum obliqua, obauriformis; perist. subsimplex, margine columellari subreflexo, externo expansiusculo.*

Long. 17, diam. $6\frac{1}{2}$ mill.; ap. 7 mill. longa, 3 lata.

β . *Fulvo-lutescens, anfractibus superis saturate corneo-strigatis.*

Hab. Sandwich Islands (Dr. Frick).

8. ACHATINELLA (NEWCOMBIA) SULCATA, Pfr. *T. subperforata sinistrorsa, oblongo-turrita, solidula, striatula et liris confertis, in anfr. superioribus compressis, tum rotundatis cincta, castanea, nitidula; spira regulariter attenuata, apice acutiuscula; sutura subsimplex; anfr. fere 6 planiusculi, supremi albo-flammulati, ultimus $\frac{2}{3}$ longitudinis subæquans, basi saccatus, saturatius castaneus; columella levissime plicata; apertura obliqua, acuminato-ovalis; perist. tenue, margine columellari superne dilatato, reflexo, externo expansiusculo.*

Long. $12\frac{1}{2}$, diam. $5\frac{2}{3}$ mill.; ap. $5\frac{2}{3}$ mill. longa, $3\frac{1}{2}$ lata.

Hab. Sandwich Islands (Dr. Frick).

9. ACHATINELLA (NEWCOMBIA) MINUSCULA, Pfr. *T. subimperfurata, sinistrorsa, ovato-turrita, tenuiuscula, sub lente minute decussata, vix nitidula, fusciscenti-albida; spira turrito-conica, apice obtusiuscula; sutura simplex; anfr. 5 vix convexiusculi, mediani fusco-variegati, ultimus spira paulo brevior, fascia fusca*

circundatus et basi rotundata fusco-areolatus; columella vix plicata; apertura parum obliqua, semiovalis; perist. simplex, acutum, margine columellari superne dilatato, reflexo.

Long. 10, diam. 5 mill.; ap. $4\frac{1}{2}$ mill. longa, $2\frac{1}{2}$ lata.

Hab. Sandwich Islands (*Dr. Frick*).

10. *CYLINDRELLA EXIMIA*, Pfr. *T. vix rimata, cylindraco-turrata, solidula, confertissime subgranulato-striata, opaca, pallide violaceo-fulvida; spira sensim attenuata, late truncata; anfr. superst. 8 vix convexiusculi, supra suturam interstitiis nudis subcrenati, ultimus vix solutus, basi acute carinatus; apertura subcircularis, basi angulata; perist. tenue, undique expansiusculum.*

Long. 27, diam. medio $7\frac{1}{2}$ mill.; ap. diam. 5 mill.

Hab. —?

11. *BULIMUS MARIE*, Albers. *T. anguste umbilicata, oblongo-conica, solida, sublævigata, alba, punctis et strigis obsoletis corneis plerumque notata; spira conica, acuta; anfr. $6\frac{1}{2}$ convexiusculi, ultimus spiram subæquans, basi vix attenuatus; columella plica parvula, dentiformi munita; apertura vix obliqua, acuminato-oblonga, intus fusca; perist. rectum, margine dextro leviter arcuato, columellari sursum dilatato, patente.*

Long. 33, diam. 14–15 mill.; ap. 16–17 mill. longa, $7\frac{1}{2}$ lata.

β. Anfractibus superis corneis, lacteo punctato-strigatis, ultimo strigis lacteis denticulatis et violaceo-corneis alternantibus picto.

Hab. Texas.

4. DESCRIPTION OF A NEW CYRENA FROM CEYLON, AND OF NEW SIPHONARIÆ. BY SYLVANUS HANLEY, F.L.S., ETC.

CYRENA TENNENTII. *Testa ovato-subtrigona, solida, ventricosa, inæquilaterali, sublævigata, epidermide tenui impolita fusco-lutescente vestita: umbonibus tumidis, decorticatis, valde prominentibus, vix obliquis; latere antico anguste rotundato; latere postico longiore subattenuato, ad extremitatem obtuse rotundato; margine ventrali arcuato; margine dorsali antice declivi, convexo, postice subdeclivi, convexiusculo; lunula nulla; superficie interna albido-violascente; dentibus lateralibus brevibus, validis, obtusis; antico approximato, postico remoto: sinu palliari brevissimo, acutissimo.*

Long. 13 lin., lat. 18 lin.

Hab. In fluvio Ariho Taprobanensi.

This remarkable-looking species, which reminds one slightly of *Gnathodon cuneatus*, forms part of the interesting collection of Sir Emerson Tennent, who took it from the pools of the Ariho River (which flows into the Gulf of Mancar), below the great stone dam, by which it was intended to divert the water, in order to supply the Giant's Tank.

I observe no species in Deshayes's most useful, though crude, monograph, which at all resembles it in aspect. Its dentition fixes it in *Cyrena* proper: the hinge-margin is strong, and the cardinal teeth of the right valve peculiarly large. The inner disk, beneath the umbones, has a redder tint; there is neither a lunule, nor any indication of an umbonal ridge.

SIPHONARIA BRUNNEA. *S. testa solida, obovali, pyramidato-subdepressa, vel omnino brunnea, vel (in junioribus) costarum brunnearum interstitiis subalbidis; costis permultis parvis (haud autem filiformibus) saturatioribus subrotundatis radiata; vertice albedo, subcentrali, subacuto, aliquantulum adunco; lateribus æqualibus; angulo siphonali satis conspicuo; superficiei interna albida, viz ad marginem crenatum brunneo colore articulata.*

Long. $10\frac{1}{2}$ lin., lat. 9 lin.

Hab. In insula Bermuda. Mus. Cuming.

The only four examples known to me are somewhat (though slightly) rubbed, so that it is difficult to say whether the moderately raised ribs are smooth or nodosely crenated. From the prevalence of interstitial costellæ, especially posteriorly, the number of decided ribs (none of which are peculiarly conspicuous) seems variable with age: the range is apparently from thirty to forty.

S. CARBO. *S. testa solida, subsymmetrica, rotundato-ovali, pyramidato-subdepressa, extus intusque ubique picea; costis permultis, haud autem confertis, subnodosis, et satis elevatis radiata; vertice centrali, recto, simplici; lateribus æqualibus; margine crenato: impressione siphonali intus (viz etiam extus) conspicua.*

Long. 11 lin., lat. $9\frac{1}{2}$ lin.

Hab. — ? Mus. Cuming.

The only individual known to me might pass externally for *S. brunnea*, and internally for a dwarf *characteristica*. From the former it is readily distinguished by the uniform and intense darkness of its somewhat bronzed interior, from the latter by its very numerous and close-set ribs, which are apparently equal in breadth, and more or less blunt.

S. PARMA. *S. testa obovata, pyramidato-depressa, solida, subsymmetrica, albida, costis permultis confertis subæqualibus rotundatis muticis (viz autem lævigatis) radiata; interstitiis linearibus castaneis; lateribus æqualibus; vertice centrali, simplici, subacuto; costa siphonifera duplici satis conspicua; pagina interna superne ferruginea, ad marginem crenatum albida.*

Long. $8\frac{1}{2}$ lin., lat. 8 lin.

Hab. In Africa Occidentali. Mus. Cuming.

The only individual I have seen is disposed to be much dilated posteriorly, and is livid around the prominent umbo: these charac-

ters may prove to be accidental, and not specific. Its ribs, which are very slightly worn, have here and there a subnodulous aspect: upon the whole it approaches the typical *sipho* (which I regard as perfectly distinct from *exigua*), but is more conic, with the ribs much more elevated, and with very distinct interstitial colouring.

S. EXULUM. *S. testa parva, solida, ovali-rotundata, pyramido-subdepressa, subsymmetrica, nigro-cærulescente, costis multis cinereis parvis obtusis plerumque alternatis haud confer-tim radiata: vertice centrali, laevi, nigro-fuscescente, simplici, obtusiusculo: latere siphonifero aliquantulum majore: margine subintegro: pagina interna picea, ad apicem pallidiore, vel subalbida, ad marginem albido brevissime radiata.*

Long. 7 lin., lat. 6 lin.

Hab. Norfolk Island. Mus. Hanley.

Very distinct from any species known to me. In the example described there are about forty unarmed ribs, of which a dozen upon the hinder two-thirds of the shell are peculiarly prominent, and spring immediately from the erect vertex. There are indications of an epidermis, and of faint and crowded concentric striae.

S. REDIMICULUM, var. *S. testa parva, tenui, ovato-oblonga, arcuato-subconica, fusco albidoque zonata; costis elevatis, muticis, subæqualibus, rotundatis, subdistanter radiata; lateribus valde inæqualibus: vertice valde excentrico, postico, in junioribus adunco: costa siphonifera inconspicua: pagina tota interna fusco-purpurascente.*

Long. $6\frac{1}{2}$ lin., lat. $4\frac{3}{4}$ lin.

Hab. —? Mus. Hanley.

The comparative smoothness and almost uniform external colouring of the previously described form of this remarkable-looking shell have rendered it desirable to redescribe the species. No interstitial sculpture is present; the ribs scarcely exceed twenty in number.

5. A MONOGRAPH OF THE GENUS NYCTOPHILUS.

By ROBERT F. TOMES.

The characters of the present genus were first briefly given by Dr. Leach in a communication to the Linnean Society in March 1820, which was not, however, published until 1822.

The paper is intitled, "The characters of seven genera of Bats with foliaceous appendages to the nose;" the seven genera being *Artibeus*, *Monophyllus*, *Mormoops*, *Nyctophilus*, *Megaderma*, *Vampyrus*, and *Madateus*.

From the manner in which *Nyctophilus* is here associated with the other genera, it seems not unfair to assume that Dr. Leach regarded it as more or less closely affined to them; and they, with the exception perhaps of *Mormoops*, all appertain to the *Phyllostomidæ*.

M. Temminck, in his monograph of the genus, gives it as his opinion that it may properly be placed between *Rhinolophus* and

Nycteris; and Dr. Gray, although arranging it amongst the *Vespertilionidæ*, or Simple-nosed Bats, nevertheless places it immediately after *Nycteris*, which he considers as belonging to the *Vespertilionidæ* also. But *Nycteris* is thought by some zoologists to have some affinity with the *Rhinolophidæ*, and my own repeated examinations have convinced me that it is simply a modification of *Rhinolophus*.

From this it would seem that the genus *Nyctophilus* has always been considered by those who have studied the subject as either belonging to the *Istiophori* or Leaf-nosed Bats proper, or as having some affinity with them.

It will be the purpose of the present paper to show that the genus *Nyctophilus* is not more remote from the genus *Vespertilio*, than are the genera *Barbastellus* and *Plecotus*, and further to show that it is as intimately allied to the last of these as to any other genus.

In the course of a very careful study which I have made of the crania of a number of examples, I have detected one or two errors in the account given of the dentition, both by Dr. Leach and M. Temminck. These will be pointed out in their proper place.

FAM. VESPERTILIONIDÆ.

Genus NYCTOPHILUS.

The top of the head is but slightly elevated, not more so than in *Plecotus auritus*, and the muzzle is relatively of about the same length and substance as in that species. The forehead, between the eyes, is a little depressed, producing a slight hollow somewhat as in the genus *Taphozous*, but in a much less degree. The nose-leaves are simple; the first is placed immediately above the nostrils; it is transverse, and there is a kind of thickened line or ridge passing from the lower margin of the nostrils on each side, and uniting with its outer boundaries. The upper margin of this leaf is straight and even. The second nose-leaf is placed at a greater distance from the first, than the first is from the nostrils. It also is transverse, but is higher in the middle than at the sides, is much thicker in substance, and is thickly clothed with short bristly hairs. The nostrils are small and not prominent, nearly round when seen in front, but with a backward narrow extension nearly reaching to the outer margin of the first nose-leaf, when examined laterally. The ears are large,—about one-fourth longer than the head,—regularly ovoid, and one-fourth longer than wide. They are united at their bases by a piece of transverse membrane across the top of the head, as in *Plecotus*. This membrane is not attached to the inner edge of the ears, but to their hinder surface, so as to leave the margins free. It extends for nearly one-third of the length of the ear. The tragus is short and broad, but rather thin and membranous. Quite at its root it is narrow; but it suddenly attains its full breadth, and taking at once a vertical direction, tapers somewhat unevenly to a narrow but rounded point. The outer margin, near to the base, is the most prominent

part; it is rounded, and in some individuals with one or two projecting points. Above this prominence, about the middle of the outer margin, it is slightly hollowed or scooped out, and the inner margin has a corresponding prominent outline immediately opposite to this hollow. The tip is much narrower than any other part of the tragus, but it is nevertheless quite rounded. Although the general form of the tragus is pretty similar in all the examples I have seen, yet it appears liable to greater variations than is usual in most species of *Vespertilionidæ*. For instance, in some examples the margins, although possessing a somewhat undulating outline, are nevertheless smooth; whilst in others the whole of the outer one is finely crenulated; again, the tip is sometimes curved a little inwards, but in others it is quite straight.

The organs of flight so exactly resemble those of the genus *Vespertilio*, that it is needless to make further remarks on them, excepting to mention that the wing-membranes spring from the base of the toes.

All the hinder extremities may be similarly dismissed.

The cranium in its general appearance resembles that of several species of *Vespertilionidæ*, and so nearly, that it would be easy at first sight to confound them. The *Serotine Bat* of Europe, the *Scotophilus Carolinensis* and *Vespertilio velatus* of America, but more especially a species inhabiting the same country as the *Nyctophilus*, viz. *Vesp. Tasmaniensis*, may be cited as species, the crania of which are most like that of *Nyctophilus*.

The cerebral portion is but little elevated above the facial portion, and it rounds off but very little from the vertex to the occiput, above the foramen of which is a moderately developed occipital crest, varying considerably in different species. There is the same deep notch in the anterior part of the skull which is observable in *Vespertilio* and *Scotophilus*, caused by the imperfect development of the intermaxillary bones. Immediately above this notch is a rather broad but shallow depression, occupying the position of the nasal bones. It is as deep from side to side as from before to behind; but there is one point where it runs a little deeper than elsewhere, just at the hinder ends of the nasal bones. Precisely the same kind of depression occurs in the cranium of the *Barbastelle Bat*. But in *Nyctophilus* the depression is rendered more conspicuous by the somewhat more elevated position of the *malar processes*.

The zygomatic arches are not very much arched outwards, less so than in many species of *Vespertilio*, such as *V. Nattereri*, but quite as much so as in *Plecotus*. The orbits extend rather markedly forward, in one species almost to the root of the canine tooth, whilst the palatal portion of the maxillary bones reaches as far back as usual, so as to give a somewhat greater extent of floor to the orbit than usual. The bony palate extends backwards almost to the condyloid fossa; but its hinder margin is so much scooped out that its middle does not much exceed the middle of the zygomatic arch, in a backward direction. In this respect it resembles the same part in *Plecotus*; in *Barbastellus*, *Vespertilio*, and *Scotophilus* it is doubly emarginate.

The teeth of the upper jaw, when seen from below, present two straight lines, somewhat diverging towards their hinder ends, just as in *Vesp. velatus*, *Scot. serotinus*, *Scot. Carolinensis*, and *Barbastellus*. The two incisors are the only teeth which deviate from these lines, being placed more inward than the canines, which terminate them. Seen laterally, the upper teeth have a curved outline, bending slightly upward from the root of the zygoma to the most anterior part of the intermaxillary bone. The exact form of the lower margin of the maxillary and intermaxillary bones is tolerably well indicated by the range of the teeth, as just stated; and it may be here remarked, that this is a point worthy of attention in the classification of the *Vespertilionidæ*.

The lower jaw so closely resembles that of the generality of the *Vespertilionidæ*, that I consider it only necessary to state that it appears to resemble the same part in *Scot. Noctula* as closely as in any other species, differing only in having the coronoid process a little more elevated.

Commencing the description of the teeth themselves with the upper incisors, I find them to be two in number, short and conical, and furnished with a distinct *cingulum*, which passes into a point on the hinder side of the tooth, well defined in some species, but scarcely observable in others. In those in which it does occur, it constitutes a peculiarity quite distinct from the bifid incisors of some species, such as the *Barbastelle*, where the *cingulum* is left entire, and the apex of the tooth appears as if cleft.

The canines are somewhat shorter and relatively a little stouter than in *Vespertilio* and *Plecotus*, and also shorter but not stouter than in *Scotophilus*. The next tooth, the only premolar in the upper jaw, and the following three true molars, have the form and proportions so usual in the *Vespertilionidæ*, that they require no special notice, excepting to state that the posterior one is a little smaller than is generally observable.

In describing the teeth of the lower jaw, two errors which have been made respecting their number require correction. Dr. Leach states that the lower incisors are six in number, and M. Temminck, describing afterwards from the same specimen, could find but four. After diligently examining a considerable number of skulls, I have satisfied myself that the account given by Dr. Leach is correct, for in no instance can I discover less than six lower incisors; but in two examples the outer one on each side is wholly hidden by the one next to it, so that unless the skull be carefully cleared of the investing membranes, it would be extremely difficult to see more than four of these teeth; hence has probably arisen the error.

They are cylindrical at the base, and for a considerable part of their length; but expand into flattened fan-shaped summits, having three lobes or points. The canines are of the usual form, and are not, as has been stated, furnished with a posterior lobe or spur. What has been mistaken for a part of the canine, is in fact a small and pointed premolar, placed so close behind it as to seem continuous with it. On instituting an examination of the canines, and comparing them with those of other species, I find that the *cingulum* is

not so much developed posteriorly as in many others. In the common *Noctule*, for instance, although the canine presents only a mere trace of thickening of the base anteriorly, it nevertheless passes into a small but distinct spur or point behind. The small anomalous premolar alluded to is situated in the same line with the teeth, between which it is placed in such a manner as to be equally visible from within or without. Its form is conical. The next tooth is also regularly conical, and furnished with a broad basal collar or *cingulum*; after this come the three true molars, presenting the form common to all the *Vespertilionidæ*.

The dentition of the genus may be given as follows; and as that of all the species is numerically similar, it will render repetition unnecessary.

Dentition.—In. $\frac{1.1}{6}$; C. $\frac{1.1}{1.1}$; P. M. $\frac{1.1}{2.2}$; M. $\frac{2.3}{2.3} = \frac{12}{18}$.

1. NYCTOPHILUS GEOFFROYI, Leach.

Nyct. Geoffroyi, Leach, Linn. Trans. xiii. p. 73, 1820–22; Less. Man. p. 86, 1827; Fisch. Synop. Mamm. p. 135, 1829; Temm. Mon. ii. p. 47, 1835–41; Wagn. Supp. Schreib. i. p. 442, 1840; Less. Nouv. Tab. Règn. Anim. p. 33, 1842; Schinz. Synop. Mam. i. p. 217, 1844.

Of the three species treated of in the present monograph, the first, from its size, is unquestionably the one on which Dr. Leach established the genus.

The original description in the Linnean Transactions is much too vague to discriminate the exact species with certainty; but M. Temminck having become possessed of the original specimen, and given a more detailed description of it, I am enabled to determine with certainty which of the species here given is the true *N. Geoffroyi*.

I intend, therefore, first to give a description of this species, and then to point out briefly what I consider sufficient differences to constitute three other species. One of these has indeed been repeatedly described as a *Vespertilio*—*Vesp. Timoriensis*; but it is strictly a *Nyctophilus*, as I have ascertained by the examination of the original specimen in the Paris Museum.

The face is moderately hairy, the hairs being pretty regularly scattered, but a little thicker on the upper lips and on the second nose-leaf than elsewhere. Immediately over the eye is a small tuft of bristle-like black hairs, and a similar one near the hinder corner of the eye. At the angle of the mouth a few similar hairs may be observed. The fur of the back extends to a very trifling extent on to the interfemoral membrane, but all the other membranes are perfectly naked, and of a dark brown colour, as are also all the other naked parts, with the exception of the tragus and the contiguous parts of the inside of the ear, which are brownish-yellow.

The fur of the body is rather long, thick, and very soft.

On all the upper parts it is conspicuously bicoloured, black for nearly two-thirds of its length, the remainder being olive-brown, of which the extreme tips are rather the darker portion. On the membrane uniting the ears the fur is uniform yellowish-brown.

The fur of the throat and flanks is uniform brownish-white, that of the latter being sometimes more strongly tinted with brown. All the remaining under-parts have the fur markedly bicoloured, black at the base, with the terminal third brownish-white, varying considerably in purity of colour in different individuals.

In the following table of dimensions, the first column refers to a specimen in Mr. Gould's collection, very kindly lent by him for my use, and from which the foregoing description has been taken: it is labelled "Albany, King George's Sound, May 19th, 1843." The dimensions in the two other columns have been taken from specimens in my own collection, and are also from Western Australia, but the exact locality unknown.

The comparative description and measurements of the crania of this and the other species will be given in a collected form appended to the description of the species the last on the list, so as to render their differences more readily apparent:—

	1.		2.		3.	
	in.	lin.	in.	lin.	in.	lin.
Length of the head and body (about) ..	1	8	2	0	1	9
— of the tail	1	4	1	5	1	5
— of the head	0	7½	0	8	0	8
— of the ears	0	9	0	9	0	9
— of the tragus	0	2½	0	3	0	3
Breadth of the ears	0	6	0	6½	0	7
— of the tragus	0	1½	0	1½	0	1½
Length of the fore-arm	1	4	1	4	1	4
— of the longest finger	2	4	2	6	2	6
— of the fourth finger	1	9	1	10	1	10
— of the thumb	0	2¾	0	3	0	3½
— of the tibia	0	7	0	7½	0	7
— of the foot and claws	0	3	0	3½	0	3½
— of the os calcis	0	5	0	6	0	6
Expanse of wings, about	9	0	9	7	9	9

2. NYCTOPHILUS TIMORIENSIS.

Vesp. Timoriensis, Geoff. Ann. du Mus. viii. p. 200. t. 47, 1806; Desm. Mamm. p. 146, 1820; Fisch. Synop. Mamm. p. 118, 1829; Temm. Mon. ii. p. 253, 1835–41; Wagn. Supp. Schreib. i. p. 520, 1840; Schinz. Synop. Mamm. i. p. 175, 1844.

Vesp. Timoriensis?, Temm. Mus. Leyd.

Plecotus Timoriensis, Less. Mann. p. 97, 1827; Is. Geoff. Guérin, Mag. de Zool. 1832; Less. Nouv. Tab. Règn. Animal, p. 23, 1842.

The forms of this species are so similar to those of the last, that it is needless to enter at greater length into details of description than is necessary to point out the differences between the two.

In all the specimens I have been able to examine, viz. the original one in the Paris Museum, and three others collected in Australia by Mr. Gould, the ears are strongly sulcated, even more so than is observable in the *Plecotus auritus*, whilst in the last species they are very

faintly, if at all, so marked; and instead of the small tufts of bristle-like hairs about the eyes, the present species has a tolerably regular series of similar ones fringing the eyelids. Again, the cranium has so strongly marked a sagittal crest as to be easily detected in the mounted specimens, whereas in *N. Geoffroyi* it is so feebly developed that no trace can be discovered, unless the skull be extracted and carefully cleaned.

But the great difference in the size of the two animals is alone sufficient to distinguish them, the one being only 9 inches in expanse of wings, whilst the other attains fully 13 inches; nearly as great a difference as exists between the *Pipistrelle* and the *Noctule* Bats.

The fur of the upper parts is bicoloured, nearly black at the base, with the terminal half dark sepia-brown; that on the top of the head and on the membrane uniting the ears, unicoloured, and paler.

Beneath, the fur has the basal half nearly black, the remainder being light brown, palest on the throat, on the middle of the belly, and on the pubes. On the shoulder of one example from "Perth, Western Australia," is a patch of brownish rust colour, but it does not occur in the other examples.

Although the original specimen of this species is reported to have been received from Timor, I am inclined to believe that there may have been some mistake respecting its locality. Among a great number of Bats from that island contained in our museums and that of Leyden, representatives of this genus do not appear; but specimens absolutely identical with the original in the Paris collection have been obtained by Mr. Gould in Western Australia; and I have noted one in the Leyden Museum, also from Australia, but without any precise indication of locality.

The following dimensions have been taken from specimens collected by Mr. Gould, the first being the one from Perth, Western Australia:—

	1. in. lin.	2. in. lin.
Length of the head and body, about ..	3 0	2 4
——— of the tail	1 10½	1 10
——— of the head	0 10	0 10
——— of the ears	0 10	0 10
——— of the tragus	0 3½	0 3½
——— of the fore-arm	1 9	1 9
——— of the longest finger	3 4	3 2
——— of the fourth finger	2 4	2 5
——— of the thumb	0 4½	0 4
——— of the tibia	0 9	0 9
——— of the foot and claws	0 5	0 5
——— of the os calcis	0 7	0 8
Expanse of wings, following the phalanges	13 6	12 9

3. *NYCTOPHILUS* GOULDI, n. s.

The present species is intermediate in size between the two last, and at first sight might be taken either for a small individual of *N.*

Timoriensis, or a large one of *N. Geoffroyi*; or these two might be regarded as the large and small varieties of the same species, and the present one as the intermediate or connecting link. This opinion I was at first disposed to entertain; but after the examination of a greater number of examples, and more especially after extracting a good number of their crania, I became convinced that they were all specifically distinct.

The shape of the head, face and ears, does not differ materially from that of the same parts in the two preceding species; the only perceptible difference beyond that of size being in the somewhat greater elevation of the top of the head. As in *N. Timoriensis*, the ears are strongly sulcated, and it bears general resemblance to that species in the quality and colouring of the fur.

The fur of the whole of the upper parts is very distinctly bicoloured: it might almost be called tricoloured; the basal half greyish-black, and the terminal half grey-brown, with the tips browner. On the rump the brown colour is rather more conspicuous than on the fore part of the back. The basal part of the upper surface of the interfemoral membrane is a little hairy in some specimens, but in others this is not observable.

On the whole of the under-surface the fur is strongly bicoloured, nearly black at the base, with the terminal third buffy grey. On the pubes the dark colour at the base of the fur is reduced to a small quantity, and it is almost wholly of the buffy white colour.

Young examples not having the wing-joints completely ossified, differ only in being somewhat smaller, and in having the fur less bright; but it is nevertheless distinctly bicoloured, and when obviously immature they are still of greater size than adult examples of *N. Geoffroyi*.

In the table of dimensions, column No. 1 refers to a female specimen from Mr. Gould's collection from Moreton Bay; No. 2 to a male from the same locality; and No. 3 to a specimen also collected by Mr. Gould at Bathurst.

	1. in. lin.	2. in. lin.	3. in. lin.
Length of the head and body, about ..	1 11	2 0	
— of the tail	1 10	1 8	
— of the head	0 9	0 9	
— of the ears	1 0	0 11	
— of the tragus	0 3	0 3	
Breadth of ears	0 8	0 8	
— of the tragus	0 2	0 2	
Length of the fore-arm	1 7½	1 6½	1 7
— of the longest finger	3 0	2 8	2 9
— of the fourth finger	2 4	2 1	2 0
— of the thumb	0 4½	0 4	0 4½
— of the tibia	0 10	0 8½	0 8½
— of the foot and claws	0 4	0 4	0 4½
— of the os calcis.....	0 6	0 6	0 6½
Expanse of wings.....	11 6	10 9	11 4

4. *NYCTOPHILUS UNICOLOR*, n. s.

All the specimens of this genus I have yet seen from Van Diemen's Land differ remarkably from those of the mainland of Australia in having the fur everywhere short and cottony, perfectly devoid of lustre, and unicoloured.

That of the upper parts is of a dark olive-brown, without any variation of tint, excepting that it is perhaps a little darker along the middle of the back than elsewhere.

Beneath, the fur is similar, but paler in colour, with the tips of the hairs a little tinged with ash-colour. This is the colour of the whole of the under parts, with the exception of a patch on the throat, which is whitish-brown, dirty white, and occasionally pure white.

Immature examples often have the fur above and beneath of a very dark olive-brown, almost black. One specimen of this dark colour which I have examined, has the spot on the throat almost pure white.

So far as I have been able to ascertain, this species is subject to very trifling variations either in colour or size in the adult state, and the size agrees so closely with that of the species which I have called *N. Gouldi*, that I at first thought the great difference in the texture and colour of the fur was due to the difference of locality.

In the crania, however, I find such differences as are ample for the distinction of the species*.

The following dimensions are taken from three specimens collected by Mr. Gould in Van Diemen's Land; the first a male, and the second a female, both adult; and the third obviously immature.

	1.	2.	3.
	in. lin.	in. lin.	in. lin.
Length of the head and body (about) . .	2 0	2 2	1 10
— of the tail	1 10	1 8	1 7
— of the head	0 8½	0 9	0 8½
— of the ears	0 10	0 10	0 9½
— of the tragus	0 2	0 1½	0 2
Breadth of the ears	0 7½	0 8	0 7½
— of the tragus	0 2	0 1½	0 1½
Length of the fore-arm	1 7½	1 7	1 6½
— of the longest finger	2 10	2 8	2 1
— of the fourth finger	2 2	2 8	2 0½
— of the thumb	0 4	0 4½	0 4
— of the tibia	0 8½	0 7½	0 7
— of the foot and claws	0 4½	0 4	0 3½
— of the os calcis	0 7	0 6½	0 7
Expanse of wings	11 6	11 0	10 4

The crania of the four species here described, differ so considerably, that I deem it advisable to make mention of them apart

* To the description of this species should have been added, that the ears are destitute of sulci, and more membranaceous than in the other species, and that the wing-membranes are darker in colour and much more opaque and leathery.

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from the foregoing description. By adopting this plan, I am enabled to bring them into more immediate comparison, which is highly desirable when we bear in mind the small size of the objects, and the consequent difficulty of rendering apparent their differences without the aid of figures. They will be described in the following order, the crania of the two species most removed from each other being found to be most dissimilar.

N. Timoriensis.—General form of the skull rather broad and flat, and rather thick in substance; sagittal and occipital crests moderately developed; depression of the nasal bones of nearly equal depth from side to side, broad, with the sides parallel for three-fourths of its length in a backward direction, and then narrowing rapidly to a point at the commencement of the sagittal ridge. Facial portion short; zygomatic arches considerably expanded. Palate nearly as wide anteriorly as posteriorly. Lower jaw strong, its lower margin considerably curved. All the teeth of moderate size and proportions.

N. Gouldi.—General form of the skull much less broad than in the last species, more elevated in the crown, and narrower anteriorly; sagittal crest considerably developed, the occipital one very small; facial depression almost obsolete, narrow, rounded-off on each, and only amounting to a concavity just at the posterior termination of the nasal bones. Facial portion relatively more produced than in the last species; zygomatic arches but little expanded. Palate much narrower in front than behind. Lower jaw as in the last species. All the front teeth, especially the upper canines, *very short and stout*.

N. unicolor.—General form of the skull very short, as broad relatively as in the first species, but not so flat, and much lighter and thinner in substance than in either of the preceding; sagittal ridge merely rudimentary, occipital one considerably elevated, especially its central portion; facial depression broad, of medium depth, well-defined, and narrower before and behind than in the middle, and with the outline of the nasal bones rather distinctly marked. Facial portion of medium length; orbits much produced in a forward direction, leaving but a small space between them and the roots of the canines; zygomatic arches a good deal expanded. Palate short, nearly as broad in front as behind. Lower jaw short and light, with a moderate degree of curvature. All the front teeth short and small.

N. Geoffroyi.—General form of the skull differing from that of all the others. It is rather long, narrow, and depressed, with a total absence of ridges or crests, and the occipital region rounds-off posteriorly without any angularity. It is thin and somewhat diaphanous; facial depression narrow, deep in the centre, not clearly defined anteriorly, and passing further back than in the other species, its posterior portion being indicated by two thread-like lines which converge to an acute point on the fore part of the central region. Facial portion of medium length, and narrowed anteriorly; zygomatic arches but very little expanded. Palate much narrower in front than behind. Lower jaw slender, with the lower outline nearly straight. Front teeth proportionally long and rather strong.

The crania of these species present the following dimensions :—

	<i>N. Timoriensis.</i> in. lines.		<i>N. Gouldi.</i> in. lines.		<i>N. unicolor.</i> in. lines.		<i>N. Geoffroyi.</i> in. lines.	
Length from the condyloid fossa to the anterior margin of the maxillary bone	0	6	0	5½	0	4½	0	4½
Length from the hinder margin of the parietal bones to the anterior margin of the maxillary bone ...	0	7	0	6¾	0	6	0	5¾
Breadth across zygomatic arches...	0	6	0	5	0	5	0	4½
Greatest breadth of the cerebral region.....	0	4	0	3¾	0	4	0	3¾
Greatest breadth of the facial depression	0	2½	0	2	0	2	0	1¾
Length of the bony palate .....	.....		0	4	0	3	0	2½
Length of the series of teeth of the upper jaw, exclusive of the incisors	0	3½	0	3	0	2¾	0	2½
Space between the points of the upper canines.....	0	2½	0	2	0	2	0	1¾
Space between the posterior molars	0	2¾	0	2½	0	2½	0	2
Greatest length of the lower jaw...	0	6½	0	5¾	0	5	0	5
Breadth of the lower jaw, taken in a vertical direction from the coronoid process	0	2½	0	2½	0	2	0	1¾
Length of the series of teeth in the lower jaw, exclusive of the incisors	0	3¾	0	3½	0	3	0	3
Space between the points of the lower canines.....	0	1¾	0	1½	0	1½	0	1½

I am especially indebted to Mr. Gould for having placed at my disposal materials which have been of great service in making out the species treated of in the present memoir. The use of specimens collected by him, with the knowledge of their exact localities, has been a great assistance in more respects than one. Besides affording evidences leading to the determination of several species, in a genus formerly supposed to be represented by only one, it has also afforded materials which have tended in some measure to the decision of what constitutes a species and what is only a variety.

It is a well-known fact, that many mammals and birds inhabiting India are found to vary remarkably in size and colour in different parts. Thus if we take some of the Bats as an instance suitable for the present occasion (and we might equally adduce many other mammals and birds) *, we shall find those inhabiting South India and Ceylon smaller and darker in colour than those occurring more northward; and on further examining the matter, we shall further discover that they are referable to the same species, and that intermediate examples may be found at intermediate localities. Not only in external conformation are they similar in their proportions, but also in the details of their osseous system. The skulls of these va-

* Among the Bats may be particularly noticed *Cynopterus marginatus*, *Scotophilus Coromandelicus*, and *Vespertilio papillosus*. See Dr. Kelaart's 'Fauna Zeylanica,' and the appended notes by Mr. Blyth, as also various notices of *Mammalia* by the latter gentleman in the Journal of the Asiatic Society.

rieties, in which we should expect to find the most constant, and therefore most valuable differences, should any exist, present no variety amongst themselves, excepting that of size; and in this latter respect they bear an exact relation to the varieties to which they belong.

With a series of specimens before me illustrating this, I have exercised the same geographical and anatomical tests to the so-called varieties of the present genus. The results of this attempt were by no means similar to those observed of the Indian species; for instead of meeting with anything like the gradation which occurs there, I have found that the largest and the smallest examples were alike inhabitants of Western Australia; whilst a third, which in point of size would have served to unite the two, was separated from them by a wide interval, occurring on the coast of New South Wales. This led to a re-examination of the specimens, and more especially to a comparison of their crania. They were found to be very dissimilar.

Here, then, are two instances, one in which the variation is clearly traceable to an external cause, and accompanied by a uniformity of internal structure, thereby corroborating the unity of the species; and another, in which the variation is not due to any apparent cause, and not only unsupported by anatomical similarity, but the unity of the species absolutely disproved by the existence of very diverse osteological characters.

Without dwelling longer on this subject, I may observe, that these remarks have arisen, in the first place, from the consideration of some exceedingly judicious observations on the variation of species, delivered at the Meeting of the British Association at Cheltenham in 1856, by the Rev. Leonard Jenyns. I must refer the reader to the communication printed entire in the Report of the Proceedings of the Association for that year, and content myself with observing that that gentleman urged the necessity of duly considering the influence of climatal and other causes in producing varieties of species; and also pointed out, that, in the absence of any such causes, any considerable amount of difference from a known species might be regarded as strong distinctive evidence.

Since the preceding account was written, I have obtained another specimen of *Nyctophilus Timoriensis*, collected in some part of Australia, but I do not know the exact locality.

As it is preserved in spirit, and in good condition, I am enabled to give a better account of the form of the face and nose-leaves than that already given, and thus add at the same time to the specific and generic characters.

The first nose-leaf is slightly emarginate and rises from immediately above the nostrils, in such a manner as to give the end of the nose somewhat the appearance of a disc, in which the nostrils are pierced. Between them and the nose-leaf, however, is a deepish transverse depression, with two pits, one over each nostril, which in some measure destroys the regular disc-like appearance of the end of the snout. The nostrils themselves are pear-shaped, with the

narrow ends curving outwards and upwards until they come in immediate contact with the base of the nose-leaf, on each side. Laterally, and below, they are encompassed by the thickened prominent part of the lip, so that they are seen to occupy the bottom of a shallow depression, and open perfectly in front. Between them is a narrow thread-like ridge. Between the first and second nose-leaf is a small but deep hollow or pit, and the second nose-leaf rises behind this in the form of a thick fleshy or cartilaginous projection, not deserving the name of "leaf," transverse in direction, but much narrower and less prominent than the true nose-leaf, and thickly covered with short hairs. Above this appears the facial depression before described. The lower lip is without hairs in front, but the naked part is not clearly defined, as it is in many *Vespertilionidæ*.

The ears are conspicuously sulcated, and their outer margins extend along the side of the face in a line with the cleft of the mouth, and end at a little more than a line from its angle. The tragus presents some points of difference from that of dried specimens. Near the base of the outer edge are two distinct points, and above them some fine crenulations, which are succeeded by a portion of the margin, which is singularly indented. It appears as if this portion were thickened, and a little produced backward and forward; so that when viewing the front surface of the tragus, this part is seen *edgewise*; and when the edge of the tragus is seen, this part presents a *flat* surface*. Above this space the edge again becomes thin, and is finely crenulated to the tip.

The carpus of the closed wing reaches to the front corner of the eye. The wing-membranes extend precisely to the base of the toes, and the *os calcis* occupies about one-third of the space between the foot and tip of the tail. The latter is composed of eight or nine vertebræ, the small terminal one being disengaged from the membrane. All the claws—of wings and feet—are singularly short and weak.

	in.	lin.
Length of the head and body	2	11
—— of the tail	2	0
—— of the head	0	11
—— of the ears	0	10
—— of the tragus	0	3
—— of the fore-arm	1	9
—— of the longest finger	3	4
—— of the fourth finger	2	6
—— of the thumb	0	4
—— of the foot and claws	0	5
Expanse of wings	13	0

* If a thin sheet of any material of a pasty consistence were taken, and pressure applied to a small portion of its edge, so as to thicken it, and raise a kind of *rim* or *bur*, visible on each side of the sheet, it would represent pretty exactly this peculiarity of the tragus in *Nyctophilus*. I may add, that having my attention directed to it, I have been able to detect the same peculiarity in the dried specimens, but much less distinctly visible.

6. AN ATTEMPT TO DISTRIBUTE THE SPECIES OF OLIVE (OLIVA, LAMARCK) INTO NATURAL GROUPS, AND TO DEFINE SOME OF THE SPECIES. BY DR. J. E. GRAY, F.R.S., V.P.Z. & ENT. SOC., ETC.

Linnæus divided the shell, usually called *Olives* by the dealers, into three species, viz. *Voluta porphyria*, *V. oliva*, and *V. ispidula*.

Gmelin added a few, and Lamarck, who published a monograph of the genus in the 'Annales du Museum,' extended the number to sixty-two. Dillwyn reduced them back to eighteen.

Duclos, who published the plates of a monograph of this genus in 1835, figures eighty-four recent species, and he considers twenty-two of the species which Lamarck described as distinct, as only varieties of other species.

In 1850 Mr. L. Reeve, in the 'Conchologia Iconica,' published the figures of 100 species, but without any attention to their affinity to each other, and with scarcely sufficient care to the more important part of the shell on which the separation of the species depends. They are there inferior to those of M. Duclos.

I believe that it is the uncertainty with regard to the number of the species which has rendered these shells, which are certainly one of the most beautiful in form, colour, and marking that we possess, so little attended to by the general collector. This is the more remarkable, as the shells are very extensively distributed over the globe, and are easily collected, and therefore are easily procured by the conchologist at a moderate rate; though it is very difficult to define the limits of many of the species on account of the great variation in the colour, and the extraordinary manner in which the marking gradually changes in their character; while other species are easily distinguished.

All the species are easily separated into very distinct groups, defined by variations in the form and structure of the shell, which are evidently produced by important modifications in the structure of the animal; and to point out these groups is the object of this paper, for I believe that by dividing the species or varieties, which have been considered as species, into such groups, I shall do much to disentangle the subject, and at least confine the confusion to definite limits; for if the groups are properly defined, it is only the specimens belonging to one of these groups that can be varieties of each other.

M. Duclos, in the monograph, divides the species into four groups:—1. *Ancilloides* (twenty-nine species); 2. *Cylindroides* (fifty species); 3. *Glandiformes* (seventeen species); 4. *Volutelles* (seventeen species).

M. D'Orbigny, in his 'Voyage to South America,' formed M. Duclos's four sections into three genera, giving to the first section the name of *Olivina*, to the second and third section that of *Oliva*, and to the fourth *Olivancillaria*, apparently founded on the form of the animal; but it is only necessary to compare his figures of the animal of the two species of the latter genus to show how little he attended to his own characters.

In the 'Zoology to Capt. Beechey's Voyage' I divided the genus into two, according to the structure of the animal, viz. *Oliva* and *Agaronia*, and observed that some *Olivæ* were furnished with an operculum not present in other species. More lately in the text to Mrs. Gray's 'Figures of Molluscous Animals,' and in the 'Guide to the Collection of Mollusca' in the Museum, I have extended the number of genera to four; separating the operculated *Olivæ* under the name of *Olivella*, and giving to an animal figured by D'Orbigny as *Oliva auricularia* the name of *Scaphura*.

These shells sometimes have an elevated shelly cross band. Lamarck had a specimen of *Oliva porphyria* (Hist. viii. 418) so marked. It is not uncommon in *O. guttata*, where it has been regarded as a species; but it is often found in other species.

A further study of the figures of the animals given by authors has induced me to revise this arrangement and propose the following

SYNOPSIS OF THE GENERA.

1. *Head exposed; tentacles elongate, subulate; eyes distinct, sub-basal. The foot elongate, dilated, front lobe semicircular; opercula none. Shell with the front belt narrow.*

* *Spire simple, with sutural groove open to the top.*

1. STREPHONA.

Pillar lip simple, not covering the front belt; inner lip cross-grooved.

2. ISPIDULA.

Pillar lip simple, not covering the front belt; inner lip thickened, the whole length with two or three slight grooves in front.

3. RAMOLA.

Pillar lip simple, not covering the front belt; inner lip with a series of transverse parallel grooves in front extending over the pillar.

4. CARMIONE.

Pillar lip expanded so far back as to cover the front belt, and with an oblique raised ridge in front; inner lip grooved.

** *Spire callous, obliterating the sutural grooves, except on the last whorl.*

5. CLANEOPHILA.

Shell ovate or obconic; aperture wide. Pillar lip expanded. Pillar twisted and grooved in front. Front belt broad.

6. GALEOLA.

Shell subcylindrical; spire small; aperture linear. Pillar lip simple, defined; inner lip grooved. Front belt narrow.

II. *Head scarcely exposed; tentacle short; eyes none; foot elongate, dilated in front (one-coloured). Shell, sutural groove open.*

7. ANAZOLA.

Shell subcylindrical or subovate; aperture oblong, thickened; front belt broad, double.

8. AGARONIA.

Shell subovate; aperture ovate; pillar slightly thickened; front belt single, moderate.

III. *Head hidden; tentacles none; eyes none; foot short, very broad, rounded on the sides, one-coloured; opercula distinct.*

9. OLIVINA.

Spire conical; sutural groove open to the apex; aperture of shell moderate; operculum distinct; foot very short, front lobes linear.

10. SCAPHULA.

Spire conical; sutural groove open to the apex; aperture of shell wide; pillar lip thick, smooth, with two grooves in front; operculum none?; foot large, front lobes very large, rounded.

11. MICANA.

Spire callous; sutural groove only open on the last whorls; aperture moderate; operculum distinct.

1. STREPHONA.

Shell subcylindrical; spire conical or flattish, small; aperture linear; pillar lip simple, only expanded in front, and not covering the callus; front belt narrow; inner lip cross-grooved. Foot elongate, longer than the shell, broad, rounded behind, dilated on the sides, which are bent up and cover the shell, the front lobes nearly semicircular, rather produced and acute at the hinder outer angles. Head exposed; tentacles elongate; eyes one-third from the base; operculum none.

Adanson, in his 'Hist. Nat. du Sénégal,' regards all the specimens of this genus as belonging to one species, observing:—"La couleur de cette coquille est peu constante. J'en ai de blanches, de jaunes, de jaunes livids, de jaunes verd, &c., même de verdâtres sans aucun mélange. J'en ai aussi qui, sur ces différens fonds, sont taches, tigrées, marbrées ou couvertes de zigzags, qui s'étendent tantôt sur leur longueur, tantôt sur leur largeur. Ces taches, ces points, ces bandes, et ces lignes sont cendres, noir ou bleuâtre dans les unes, brun, rougeâtres ou pourpres dans les autres: enfin leur mélange est si varié, que ce seroit perdre son tems que de faire l'énumération de toutes celles qui ont été décrites ou figurées par leurs auteurs. Je

me suis contente de citer une vingtaine des principales variétés auxquelles on peut rapporter tous les autres, dont plus de deux cents sont parvenues à ma connaissance. Leur intérieur est aussi blanc, jaune, violet, ou pourpre foncé."—p. 65.

It would appear either that the animals vary as much in colour as the shells, or, if permanent, they present good character for the separation of the species, according to the specimens of the animal figured by Messrs. Quoy and Gaimard in the 'Voyage of the *Astrolabe*,' t. 46, which are copied and improved (?) by M. Duclos. The animal of the black variety of *O. maura* is black, minutely brown-dotted, and with a regular pale edge to the foot. *S. erythrostoma* and *S. Textilina* is pale brown, with large brown spots. *S. elegans* and *S. sanguinolenta* are yellow, minutely black-dotted; it is interesting to observe that the shells, which are allied in colour and form, also have animals similarly allied.

1. STREPHONA PORPHYRIA.

Reddish-brown, spotted with angular reddish lines; spire and front of pillar violet, spire conical.

Voluta Porphyria, Linn. S. N. ii. 87.

Oliva Porphyria, Lamk. no. 1; E. M. t. 351. f. 4; Duclos, Oliv. t. 24. f. 15; Reeve, C. I. t. 1. f. 2.

Hab. Panama.

2. ST. ANGULATA.

Throat and pillar reddish.

Voluta incrassata, Soland. MSS.; Dillw. R. S. 516.

Oliva angulata, Lamk. no. 6; E. M. t. 363. f. 16; Duclos, Oliv. t. 17. f. 9, 10; Reeve, C. I. t. 1. f. 1.

Oliva azemula, Duclos, *vide* Reeve.

Hab. Gulf of Nicolya.

3. ST. CRUENTA.

Throat orange.

Oliva guttata, Lamk. n. 14; Dillw. 32.

Oliva maculata, Duclos, Oliv. t. 15. f. 1-6; Reeve, C. I. t. 14. f. 30.

Voluta cruenta, Solander, MSS.; Dillw. R. S. 514.

Voluta ispidula, Martini, ii. f. 491, 492.

Oliva Mantichora, Duclos, Oliv. t. 15. f. 7, 8.

Var. subangular, with a raised rib behind.

Voluta annulata, Gmelin, S. N. 3441; Dillw. R. S. 515.

Voluta balleata, Soland. MSS.

Oliva leucophæa, Lamk. n. 14; E. M. t. 363. f. 2.

Hab. Isle of France.

4. ST. MAURA.

Black, yellow or grey ; throat and pillar lip white.

Oliva maura, Lamk. n. 7 ; E. M. t. 366. f. 1, 2 ; 365, f. 1, 3 ; Duclos, Oliv. t. 23. f. 1-12 ; Reeve, t. 7. f. 10.

Oliva sepulchralis, Lamk. n. 7 ; E. M. t. 365. f. 1.

Voluta Oliva, F, H, L, K, O, P, Q, S ; Dillw. R. S. 512.

Cylindrus Nigellus, Menschen.

Oliva fulminans, Lamk. n. 9 ; E. M. t. 364. f. 4.

Oliva funebris, Lamk. n. 26 ; Martini, f. 480, 481.

Animal dark brown, minutely black-dotted, with a pale edge to the foot. See Voy. Astrol. t. 46. f. 20 ; Duclos, t. 30.

5. ST. TRICOLOR.

White, black, and yellow ; front (and sometimes all the inner lip) yellow brown.

Oliva tricolor, Lamk. no. 22 ; E. M. t. 365. f. 4 ; Duclos, Oliv. t. 20. f. 9-13 ; Reeve, C. I. t. 12. f. 22.

O. sanguinolenta, Lamk. no. 23 ; Duclos, Oliv. t. 20. f. 14-16 ; Reeve, C. I. t. 13, f. 25.

Voluta Oliva, C. & F. Dillw. R. S. 512.

Oliva zebra, Kuster, C. C. t. 5. f. 5, 6.

Oliva Philantha, Duclos, Oliv. t. 20. f. 5, 6.

Oliva evania, Duclos, Oliv. t. 20. f. 3, 4.

Oliva elegans, Lamk. no. 11 ; E. M. t. 367. f. 3, t. 362. f. 3 ; Duclos, Oliv. t. 21. f. 1-6 ; Reeve, C. I. t. 12. f. 20.

Oliva glandiformis, Lamk. no. 27.

Oliva tigrina, Lamk. no. 44 ; Duclos, Oliv. t. 21. f. 7-12, t. 32. f. 1, 2 ; Reeve, C. I. t. 12. f. 21.

Oliva Macleaya, Duclos, Oliv. t. 21. f. 13-16.

Hab. Fegee Islands, Madagascar.

Animal yellow, minutely black-dotted (Voy. Astrol. t. 46. f. 2-6 ; Duclos, t. 31).

6. ST. EPISCOPALIS.

Throat purple.

Oliva episcopalis, Lamk. no. 12 ; Lest. t. 719. f. 3 ; Duclos, t. 10. f. 11, 12 ; Reeve, C. I. t. 13. f. 24.

Voluta oliva, D. Dillw. R. S. 512.

7. ST. ERYTHROSTOMA.

Throat saffron colour.

Oliva erythrostoma, Lamk. no. 3 ; E. M. t. 361. f. 3 ; Duclos, Oliv. t. 13. f. 1-7 ; Reeve, C. I. t. 5. f. 7.

Cylindrus erythrostoma, Menschen.

Voluta erythrostoma, Dillw. R. S. 511.

Oliva ponderosa, Duclos, Oliv. t. 13. f. 8, 9 ; Reeve, C. I. t. 2. f. 4.

Oliva tremulina, Lamk. no. 5; Duclos, Oliv. t. 11. f. 1-9; Reeve, C. I. t. 4. f. 6.

Oliva Olympiadina, Duclos, Oliv. t. 12. f. 10, 11, 12; Reeve, C. I. t. 3. f. 5.

Oliva asemula, Duclos, Oliv. t. 14. f. 1, 2, 3.

Hab. Mauritius and Philippines.

Animal reddish, with large brown spots (Voy. Astrol. t. 46. f. 1; Duclos, t. 31).

8. ST. TEXTILINA.

Mouth white.

Oliva obtusaria, Lamk. no. 53.

Oliva textilina, Lamk. no. 2; E. M. t. 362. f. 5; Duclos, Oliv. t. 14. f. 2-9; Reeve, t. 6. f. 9.

Oliva Pica, Lamk. no. 4.

Oliva zeilanica, Lamk. no. 54.

Oliva hepatica, Lamk. no. 35.

V. oliva, var. A., Dillw. R. S. 511.

Voluta erythrostoma, var., Dillw. R. S. 511.

Oliva granitella, Lamk. no. 18.

Oliva nobilis, Reeve, C. I. t. 2. f. 3, mouth pale reddish.

Oliva irisans, part, Reeve, C. I. t. 6. f. 8, *b, c, d.* (not *e*).

Hab. Mauritius.

Animal reddish, with large brown spots (Voy. Astrol. t. 46. f. 7 *a*).

9. ST. SCRIPTA.

Oliva scripta, Lamk. n. 21; E. M. t. 362. f. 4; Duclos, Oliv. t. 10. f. 13, 14; t. 30. f. 5, 6, animal; Reeve, C. I. t. 14. f. 27.

Oliva mustelina, Lamk. n. 24; Duclos, Oliv. t. 20. f. 1, 2; Reeve, C. I. t. 13. f. 23.

10. ST. LITTERATA.

Oliva litterata, Lamk. n. 20; E. M. t. 362. f. 1; Duclos, Oliv. t. 10. f. 15, 16; Reeve, C. I. t. 11. f. 18.

Hab. West Indies.

Animal grey.

11. ST. PERUVIANA.

Oliva senegalensis, Lamk. n. 29; E. M. t. 364. f. 3.

Oliva Peruviana, Lamk. n. 28; E. M. t. 367. f. 4; Duclos, Oliv. t. 15. f. 9-16; Reeve, C. I. t. 9. f. 14.

Var. Back of whorl more or less angular.

Hab. Peru; Central America.

12. ST. RETICULARIS.

Mouth white; suture with groups of radiating lines.

Oliva fusiformis, Lamk. no. 20; E. M. t. 367. f. 1; Duclos, Oliv. t. 16. f. 12-16; Reeve, C. I. t. 8. f. 11.

- O. vermiculata*, Lamk.
O. arancosa, Lamk. no. 19; E. M. t. 363. f. 1.
O. reticularis, Lamk. no. 16; E. M. t. 361. f. 1; Duclos, Oliv.
 t. 9. f. 3-12; Reeve, C. I. t. 10. f. 16.
O. hepatica, Lamk. no. 35, 36.
O. Timoria, Duclos, Oliv. t. 17. f. 11-13.
O. alba, Lamk. no. 42; E. M. t. 368. f. 4.
O. harpularia, Lamk. no. 34; Chemn. x. f. 1376. 77; Reeve, C.
 I. t. 14. f. 28 (worn).
O. ustulata, Lamk. no. 36.
O. venulata, Lamk. no. 13; E. M. t. 361. f. 5; Duclos, t. 16.
 f. 5, 6.
O. obesina, Duclos, t. 16. f. 9, 10.
O. pindarina, Duclos, t. 16. f. 7, 8.
O. Julieta, Duclos, t. 16. f. 3, 4; Reeve, C. I. t. 9. f. 15.

The following twenty-three species (?) are more or less allied to the last.

13. ST. POLPASTA.

- Oliva polpasta*, Duclos, Oliv. t. 16. f. 1, 2; Reeve, C. I. t. 14. f. 29.

14. ST. STAINFORTHII.

- Oliva Stainforthii*, Reeve, C. I. t. 19. f. 40.

15. ST. PINTAMELLA.

- Oliva Pintamella*, Duclos, Oliv. t. 33. f. 7, 8.

16. ST. ATALINA.

- Oliva atalina*, Duclos, Oliv. t. 9. f. 9, 10.

17. ST. QUERSOLINA.

- Oliva Quersolina*, Duclos, Oliv. t. 9. f. 7, 8.

18. ST. NITIDULA.

- Oliva nitidula*, Duclos, Oliv. t. 9. f. 3, 4.

19. ST. ORIOLA.

- Oliva oriola*, Lamk. no. 41; E. M. t. 366. f. 3; t. 367. f. 2;
 Duclos, t. 10. f. 1, 2.
Voluta oliva, V. Dillwyn, R. S. 513.

20. ST. PAXILLUS.

- Oliva paxillus*, Reeve, C. I. t. 21. f. 56.

21. ST. SPLENDIDULA.

- Oliva splendidula*, Sow. Tank. Cat. App. 32; Duclos, t. 9. f. 1, 2;
 Reeve, C. I. t. 11. f. 17.
Hab. Panama.

22. ST. TIGRIDELLA.

Oliva Tigridella, Duclos, Oliv. t. 8. f. 13-16.

23. ST. STELLATA.

Oliva stellata, Duclos, Oliv. t. 8. f. 11, 12.

24. ST. LENTIGINOSA.

Oliva lentiginosa, Reeve, C. I. t. 19. f. 45.

25. ST. JASPIDEA.

Oliva Jaspidea, Duclos, Oliv. t. 8. f. 9, 10.

O. Duclosii, Reeve, C. I. t. 19. f. 44.

Hab. Philippines.

26. ST. KALEONTINA.

Oliva kaleontina, Duclos, Oliv. t. 8. f. 7, 8 ; Reeve, C. I. t. 20. f. 49.

Hab. Gallapagos.

27. ST. TRINGA.

Oliva Tringa, Duclos, Oliv. t. 8. f. 5, 6.

28. ST. AUSTRALIS.

Oliva australis, Duclos, Oliv. t. 8. f. 3, 4 ; Reeve, C. I. t. 19. f. 42.

Hab. Swan River (*Cab. Gray*).

29. ST. ANOMINA.

Oliva anomina, Duclos, Oliv. t. 8. f. 1, 2.

30. ST. CUMINGII.

Oliva Cumingii, Reeve, C. I. t. 11. f. 19.

Hab. California.

31. ST. FLAMMULATA.

Oliva flammulata, Lamk. no. 17 ; E. M. t. 367. f. 5 ; Duclos, t. 8. f. 17-20 ; t. 30. f. 3, 4, animal (not Reeve, C. I. t. 19. f. 41).

Vol. ispidula, var., *Borm.*

V. oliva, T. Dillw. R. S. 513.

Hab. — ?

32. ST. OLORINELLA.

White.

Oliva olorinella, Duclos, Oliv. t. 6. f. 15, 16.

33. ST. FLAVEOLA.

Oliva flaveola, Duclos, Oliv. t. 6. f. 17-20.

34. ST. LIGNEOLA.

Oliva ligneola, Reeve, C. I. t. 21. f. 57.*Hab.* — ?

35. ST. SCHUMACHERIANA.

Front of pillar lip brown.

Oliva Schumacheriana, Beck.*Hab.* California.

36. ST. RUFULA.

Spire very short.

Oliva rufula, Duclos, Oliv. t. 19. f. 9, 10; Reeve, C. I. t. 20. f. 50.

37. ST. NEOSLINA.

Oliva Neoslina, Duclos, Oliv. t. 19. f. 11–16.

38. ST. SIDELIA.

Oliva sidelia, Duclos, Oliv. t. 19. f. 1, 2.

39. ST. CAROLINIANA.

Oliva caroliniana, Duclos, Oliv. t. 19. f. 3–8.*O. bubiformis*, var., Reeve.

40. ST. HAMILTONA.

Oliva Hamiltona, Duclos, Oliv. t. 19. f. 3, 4.

41. ST. MULTIPLICATA.

Oliva multiplicata, Reeve, C. I. t. 20. f. 52.

42. ST. LUGUBRIS.

Oliva lugubris, Lamk. no. 25; Duclos, Oliv. t. 10. f. 5, 6.

2. ISPIDULA.

Shell cylindrical; spire conical, sutural groove open to the top; aperture linear; pillar lip simple, only dilated in front, not covering the front belt; inner lip thickened the whole length, with two or three oblique grooves in front.

Foot elongate, longer than the shell, acute behind, not dilated on the sides in front, not or only slightly covering the shell, front lobes moderate, broad, produced and acute at the sides; tentacles elongated, exposed; eyes one-third from the base; operculum none. — *Duclos*, t. 7. f. 2.

1. *ISPIDULA VARIABILIS*.

Throat brown ; inner lip thickened with two or three deep grooves in front.

Oliva ispidula, Lamk. no. 40 ; E. M. t. 366. f. 6 ; Reeve, t. 17. f. 34 ; Duclos, Oliv. t. 7. f. 1-14, animal.

O. candida, Lamk. no. 42 ; E. M. t. 360. f. 4.

Voluta oliva, R. S. Dillw. R. S.

3. *RAMOLA*.

Shell subcylindrical ; spire small, conical, sutural groove open to the tip ; aperture narrow ; anterior belt narrow, single. Pillar lip expanded in front, not covering the front belt, with numerous equal transverse grooves in front. Operculum none. "Foot large, covering the shell."—*Adams*.

1. *RAMOLA VOLUTELLA*.

Oliva volutella, Lamk. no. 43 ; Duclos, Oliv. t. 6. f. 7-14 ; Reeve, C. I. t. 21. f. 54.

Oliva cærulea, Gray in Wood, Supp. t. 6. f. 36.

Olivella volutella, Gray, Guide Moll. B.M. 24 ; Fig. Moll. t. 83 a. f. 2.

Oliva Razamola, Duclos, Oliv. t. 6. f. 5, 6.

Hab. West Coast of America.

4. *CARMIONE*.

Shell ovate, subcylindrical ; spire small, sutural groove open to the tip ; aperture linear, narrow. Pillar lip expanded, sufficiently far back as to cover the front callous belt, and furnished with a more or less distinct raised cross ridge ; inner lip grooved.

1. *CARMIONE VENTRICOSA*.

Voluta ventricosa, Soland. MSS. ; Dillw. R. S. 514.

Oliva inflata, Lamk. no. 32 ; E. M. t. 364. f. 5 ; Duclos, Oliv. t. 22. f. 1-16 ; Reeve, C. I. t. 15. f. 31.

O. fabigina, Lamk. n. 52 ; E. M. t. 363. f. 5.

O. bicincta, Lamk. no. 33 ; E. M. t. 364. f. 1.

O. undata, Lamk. no. 31 ; E. M. t. 364. f. 7.

Oliva bicingulata, Lamk. Ann. E. M. t. 364. f. 1.

O. tigrina, Lamk.

O. bulbiformis, Duclos, t. 27. f. 10-12 ; Reeve, C. I. t. 13. f. 26.

Hab. Moluccas.

5. *CLANEOPHILA*.

Shell ventricose or obconic ; spire callous, the sutural groove closed on all, except the last whorl ; aperture ample. Pillar lip expanded, swollen and callous behind, twisted and obliquely grooved

in front. Foot elongate, about as long as the shell, broad, rather tapering behind, dilated in front, and covering the greater part of the shell, front lobes rather large, crescent-shaped, outer hinder angles acute. Tentacles elongate; eyes one-third from the base. Operculum none.—*Duclos*, t. 33. f. 6.

* *Shell obconic; front belt rather narrow. Spire broad, depressed.*

1. CLANEOPHILA BRASILIANA.

Oliva Brasiliana, Lamk. Ann.; *Duclos*, Oliv. t. 29. f. 1, 3; t. 33. f. 5, 6, animal; *Reeve*, C. I. t. 8. f. 13.
Voluta pinguis, Soland. MSS.; *Dillw.* R. S. 516.
Oliva Brasiliensis, Chemn. x. f. 1367, 68; *Lamk.* Hist. no. 45.
Hab. Brazil.

** *Shell ovate; front belt broad. Spire small, very callous.*

2. CLANEOPHILA AURICULARIA.

Shell ovate. Pillar lip slightly expanded, moderate.
Oliva auricularia, Lamk.; *Duclos*, t. 29. f. 47.
O. aquatilis, *Reeve*, C. I. t. 18. f. 37.
Olivancillaria auricularia, D'Orb. Voy. Amér. MÉR. 421. t. 59.
f. 20, 22, shell cop.; *Duclos*, Oliv. t. 32. f. 1, 2.
Oliva patula, Sow. Tank. Cat. 33.
Hab. S. America.

3. CLANEOPHILA GIBBOSA.

Shell ventricose, subangular. Mouth very wide. Pillar with a large tubercular callus in front.
Oliva claneophila, *Duclos*, Oliv. t. 29. f. 89.
O. auricularia, *Reeve*, C. I. t. 18. f. 39.
Hab. West Africa. Not Brazil, as said by Mr. *Reeve*.

6. GALEOLA.

Shell subcylindrical; spire small, acute, callous, sutural groove of upper whorl is obliterated; aperture linear. Pillar lip defined, expanded in front, not covering the front belt; inner lip thickened, cross-grooved; front belt narrow. Operculum —? Animal —?
Lamarck observed the form of the spire in *O. tessellata* (Hist. vii. 430, 433).

* *Spire conical, acute.*

1. GALEOLA IRISANS.

Spire conical, acute. Brown or yellow or greyish, uniform, or with angular marks and two interrupted bands; throat and pillar white.

Oliva irisans, Lamk. no. 10; Duclos, Oliv. t. 28. f. 7, 8, 9, 10, 11, 12.

Voluta oliva, B. Dillw. R. S. 512.

2. GALEOLA CARNEOLA.

Orange; tip of spire white.

Voluta carneolus, Gmelin.

V. carneola, Dillw. R. S. 520.

V. aurora, Soland. MSS.

Oliva carneola, Lamk. no. 39; E. M. t. 365. f. 5; Duclos, Oliv. t. 26. f. 3-16; Reeve, C. I. t. 22. f. 60.

O. Athenia, Duclos, Oliv. t. 26. f. 17-20.

O. todosina, Duclos, Oliv. t. 25. f. 9, 10.

Oliva Calosoma, Duclos, Oliv. t. 26. f. 1, 2.

Var. 1. Brown, with pale angular spots, or pale brown, with darker angular lines.

Var. 2. Subcentral angular belt.

3. GALEOLA TIGRINA.

Yellow, dark-spotted; throat and tip of spire purple.

Cylindrus tigrinus, Menschen.

Voluta tigrina, Dillw. R. S. 520; Duclos, Oliv. t. 27. f. 1-4; Reeve, C. I. t. 20. f. 53.

Oliva tessellata, Lamk. no. 38; E. M. t. 368. f. 1.

Voluta maculata, Soland. MSS.

V. Ispidula, var., Gmelin.

V. oliva, var., Born.

Hab. Philippines.

4. GALEOLA DACTYOLA.

Oliva dactyliola, Duclos, Oliv. t. 27. f. 3-9.

O. bulbiformis, Duclos, Oliv. t. 27. f. 10-13; Reeve, C. I. t. 13. f. 26.

O. leucostoma, Duclos, Oliv. t. 27. f. 14-16.

**** Spire depressed.**

5. GALEOLA AVELLANA.

Spire short, blunt; throat white.

Oliva avellana, Lamk. no. 37; Duclos, Oliv. t. 28. f. 1, 3.

O. Galeola, Duclos, Oliv. t. 28. f. 4-6.

O. irisans, Reeve, C. I. t. 6. f. 8 a (only, not b, c, d).

6. GALEOLA LEPIDA.

Oliva lepida, Duclos, Oliv. t. 25. f. 15-20.

7. GALEOLA VOLVARIOIDES.

Oliva volvarioides, Duclos, Oliv. t. 25. f. 11-14; Reeve, C. I. t. 22. f. 59.

8. GALEOLA? PYGMÆA.

Oliva pygmæa, Reeve, C. I. t. 26. f. 75.

9. GALEOLA? PICTA.

Oliva picta, Reeve, C. I. t. 26. f. 79.

Hab. Philippines.

7. ANAZOLA.

Shell ovate or subcylindrical; spire conical, sutural groove open to the tip. Aperture oblong, rather wide; pillar lip expanded; inner lip thickened, the whole length twisted and grooved in front. Belt broad, with an anterior groove in the usual place of the narrow belt.

Foot (*A. subulata*) elongate, longer than the shell, acute behind; the front half dilated, reflected over and covering the front and sides of the shell, front lobes semicircular, hinder angle acute. Tentacles short, broad. Eyes none? Operculum none.—*Duclos*, t. 31. f. 1, 2.

1. ANAZOLA GIBBOSA.

Pillar with a single groove in front, and several smaller behind it.

Foluta gibbosa, Born, Mus. 215; Dillw. R. S. 517.

Foluta utriculus, Gmel. S. N. 3441.

Oliva utriculus, Lamk. no. 46; E. M. t. 365. f. 6; Duclos, Oliv. t. 17. f. 1-8; Reeve, C. I. t. 14. f. 32.

O. cingulata, Chemn. x. f. 1369, 1370.

O. nebulosa, Lamk. no. 55; Martini, f. 539, 540.

O. gibbosa, Reeve, C. I. t. 8. f. 12.

2. ANAZOLA ACUMINATA.

Suture pencilled.

Foluta ispidula, Linn. S. N. 1188; Dillw. R. S. 517.

Fol. utriculus, var., Gmelin.

Oliva acuminata, Lamk. no. 48; E. M. t. 368. f. 3; Duclos, Oliv. t. 12. f. 1-4; Reeve, C. I. t. 16. f. 33 a, c.

3. ANAZOLA SUBULATA.

Oliva subulata, Lamk. no. 49; E. M. t. 368. f. 6; Duclos, Oliv. t. 12. f. 5-9; Reeve, C. I. t. 16. f. 33 d.

Foluta ispidula, B. Dillw. R. S.

Oliva luteola, Lamk. no. 50; Martini, f. 554.

O. triticea, Duclos, Oliv. t. 1. f. 5, 6; Reeve, C. I. t. 27. f. 82.

4. ANAZOLA LEUCOZONALIS.

Oliva leucozonalis, Gray, Beechey, Voy. 130. t. 36. f. 24; Reeve, C. I. t. 24. f. 67.

Hab. Senegal.

5. ANAZOLA UNDATELLA.

Oliva undatella, Lamk. no. 58 ; Gray, Beechey, Voy. 131. t. 36. f. 23-27 ; Duclos, Oliv. t. 5. f. 5-10 ; Reeve, C. I. t. 25. f. 73.

Voluta tenebrosa, Goodall, Wood, Ind. Supp. t. 4. f. 38.

Oliva zonalis, Menke.

Olivella undatella, Gray.

? *Oliva hieroglyphica*, Reeve, C. I. t. 24. f. 68.

O. nodulina, Duclos, Oliv. t. 5. f. 13, 14.

O. ozodina, Duclos, Oliv. t. 5. f. 19, 20.

6. ANAZOLA PULCHELLA.

Oliva pulchella, Duclos, Oliv. t. 5. f. 11, 12.

7. ANAZOLA PANICULATA.

Oliva paniculata, Duclos, Oliv. t. 5. f. 15-18.

8. AGARONIA.

Shell ovate, subcylindrical ; spire acute, sutural groove open to the top ; aperture rather wide, ovate ; inner lip defined, thin ; pillar obliquely twisted in front, with several oblique grooves ; belt moderate, single. Foot (*A. hiatula*) elongate, longer than the shell, acute behind, wider in front, covering part of the front of the shell ; front lobes semicircular, wider in front, acute at the outer hinder angles. Head hidden. Tentacles very small. Eyes none. Operculum — ? (Duclos, t. 4 *bis*.)

* *Anterior belt moderate.*

1. AGARONIA TESTACEA.

Spire conical ; suture linear, distinct to top ; pillar white ; belt brown or white, single, smooth.

Oliva testacea, Lamk. no. 51 ; Reeve, C. I. t. 18. f. 36.

Agaronia testacea, Adam.

Agaronia hiatula, Gray, Beechey, Voy. 132.

Oliva hiatula, Duclos, Oliv. t. 3. f. 13, 14.

Oliva Steeria, Reeve, C. I. t. 18. f. 37.

Hab. Pacific ; Mexico (*Lamk.*).

2. AGARONIA INDUSICA.

Pillar white.

Oliva indusica, Reeve, C. I. t. 19. f. 43.

Hab. Kurrachee.

3. AGARONIA CINCTA.

Pillar white ; shell with two brown bands.

Oliva cincta, Reeve, C. I. t. 20. f. 47.

Hab. — ?

4. AGARONIA CONTORTUPLICATA.

Pillar white ; shell grey ; throat dark red-brown.

Oliva contortuplicata, Reeve, C. I. t. 20. f. 51.

Hab. Senegal.

**** Anterior belt broader.**

5. AGARONIA HIATULA.

Pillar purple-brown in front ; belt brown or white.

Voluta hiatula, Gmelin, S. N. 3442 ; Dillw. R. S. 518.

V. ringens, Soland. MSS.

Oliva hiatula, Lamk. no. 5 ; E. M. t. 368. f. 5 ; Reeve, C. I. t. 18. f. 35.

Oliva hiatula, var., Duclos, Oliv. t. 3. f. 14, 15, t. 4 *bis*, f. 17-21.

Ancilla maculata, Schum.

Hiatula Lamarckii, Swains.

Hab. Mouth of Niger (*Adanson*) ; East coast of Africa (*Capt. Owen*).

6. AGARONIA NITELINA.

Pale brown ; front belt rather wide ; inner lip pale brown.

Oliva nitelina, Duclos, Oliv. t. 3. f. 1, 2.

Oliva ancillarioides, Reeve, C. I. t. 21. f. 55.

Hab. Kurrachee.

9. OLIVINA.

Shell subcylindrical ; spire conical ; sutural groove open to the tip ; aperture linear or subovate ; inner lip defined ; pillar obliquely twisted in front and obliquely grooved ; belt single, rather narrow. Foot (*Ol. puelchana*) short, much shorter than the shell, very broad, rounded at the sides, enveloping the front of the shell ; front lobes very small, narrow, acute at the sides. Head almost hidden. Tentacles none. Operculum distinct (D'Orb. Voy.).

*** Shell white, aperture narrow.**

1. OLIVINA GRACILIS.

Throat purplish.

Oliva gracilis, Sow., Gray, Beechey, Voy. 130. t. 36. f. 1 ; Duclos, Oliv. t. 1. f. 17, 18 ; Reeve, C. I. t. 20. f. 46.

2. OLIVINA RAZAMOLA.

Oliva razamola, Duclos, Oliv. t. 6. f. 3-6.

3. OLIVINA CALDANIA.

Oliva caldania, Duclos, Oliv. t. 6. f. 3, 4.

4. OLIVINA TUNQUINA.

Oliva tunquina, Duclos, Oliv. t. 6. f. 1, 2.

5. OLIVINA PANICULATA.

Oliva paniculata, Duclos, Oliv. t. 5. f. 13-18.

6. OLIVINA PULCHELLA.

Oliva pulchella, Duclos, Oliv. t. 5. f. 11, 12 ; Reeve, C. I. t. 30. f. 98.

Oliva oryza, Lamk. ; Reeve, C. I. t. 27. f. 81.

Oliva menilifera, Reeve, C. I. t. 27. f. 84.

Oliva pellucida, Reeve, C. I. t. 27. f. 85.

7. OLIVINA ANAZORA.

Oliva anazora, Duclos, Oliv. t. 5. f. 3, 4 ; Reeve, C. I. t. 25. f. 74.

Hab. Columbia.

8. OLIVINA LANCEOLATA.

Oliva lanceolata, Reeve, C. I. t. 30. f. 95.

Hab. Luzon.

9. OLIVINA MIRIADINA.

Oliva Miriadina, Duclos, Oliv. t. 5. f. 1, 2 ; Reeve, C. I. t. 30. f. 94.

10. OLIVINA BULLATA.

Oliva bullata, Reeve, C. I. t. 30. f. 96.

Hab. West Indies.

11. OLIVINA ALECTONA.

Oliva alectona, Duclos, Oliv. t. 4 *bis*, f. 15, 16.

12. OLIVINA PUELCHANA.

Oliva puelchana, D'Orb. Amér. Mérid. 418. t. 49. f. 13-19 ; Desh. Lamk. no. 64 ; Duclos, t. 4 *bis*, f. 1-6.

Hab. Patagonia, St. Blas.

13. OLIVINA TEHUELCHANA.

Oliva tehuelchana, D'Orb. Amér. Mérid. 418. t. 49. f. 7-12 ; Desh. Lamk. no. 63 ; Duclos, Oliv. t. 4 *bis*, f. 7-14.

Hab. Patagonia, St. Blas.

14. OLIVINA ESTHER.

Oliva Esther, Duclos, Oliv. t. 3. f. 7, 8 ; Reeve, C. I. t. 23. f. 65.

15. OLIVINA COLUMBA.

Oliva columba, Duclos, Oliv. t. 3. f. 3, 4.

16. OLIVINA STRIGATA.

Oliva strigata, Reeve, C. I. t. 25. f. 72.*Hab.* West Indies.

17. OLIVINA DEALBATA.

Oliva dealbata, Reeve, C. I. t. 25. f. 71.

18. OLIVINA CÆRULEA.

Oliva cærulea, Reeve, C. I. t. 24. f. 70.

19. OLIVINA ZENOPIRA.

Oliva zenopira, Duclos, Oliv. t. 3. f. 11, 12; Reeve, C. I. t. 24. f. 69.*Hab.* Madagascar.

20. OLIVINA SELASIA.

Oliva selasia, Duclos, Oliv. t. 2. f. 19, 20.

21. OLIVINA TERGINA.

Oliva tergina, Duclos, Oliv. t. 2. f. 13-16; Reeve, C. I. t. 26. f. 80.*Hab.* Central America.

22. OLIVINA FULGIDA.

Oliva fulgida, Reeve, C. I. t. 26. f. 78.*Hab.* West Indies.

23. OLIVINA MUTICA.

Oliva mutica, Duclos, Oliv. t. 2. f. 5-8; Reeve, C. I. t. 28. f. 86,
t. 29. f. 93.

24. OLIVINA ZIGZAG.

Oliva zigzag, Duclos, Oliv. t. 2. f. 1-4, oper. a.

25. OLIVINA MANDARINA.

Oliva mandarina, Duclos, Oliv. t. 1. f. 19, 20.

26. OLIVINA JASPIDEA.

Voluta jaspidea, Gmelin, S. N. 3442; Dillw. R. S. 519.*Oliva eburnea*, Lamk. no. 59; Dillw. 40; Duclos, t. 1. f. 13-16.*Oliva conoidalis*, Lamk. no. 59; Lister, t. 725. f. 13; Duclos,
Oliv. t. 2. f. 17, 18.*Voluta nivea*, Gmelin.*Oliva nivea*, Desh., Reeve, C. I. t. 23. f. 64.*Oliva jaspidea*, Desh., Reeve, C. I. t. 22. f. 58.*Hab.* Barbadoes (*Lister*).

27. OLIVINA MICA.

Oliva mica, Duclos, Oliv. t. 11, 12.

28. OLIVINA GUILDINGII.

Oliva Guildingii, Reeve, C. I. t. 28. f. 89.*Hab.* West Indies.

29. OLIVINA FURA.

Oliva fura, Reeve, C. I. t. 30. f. 97.*Hab.* —?

30. OLIVINA LEPTA.

Oliva lepta, Duclos, Oliv. t. 1. f. 7, 8.

31. OLIVINA FIMBRIATA.

Oliva fimbriata, Reeve, C. I. t. 29. f. 92.*Hab.* West Indies.

32. OLIVINA LINEOLATA.

Oliva lineolata, Gray in B.M. 1827, Beechey, Voy. 131.*Oliva Dama*, Goodall * in Wood, Cat. Suppl. t. 6. f. 37; Duclos, Oliv. t. 3. f. 5, 6; Reeve, C. I. t. 23. f. 63.*Oliva purpurata*, Swains. Z. Ill. t. 2. f. 1.*Oliva gracilis*, Duclos, Oliv. t. 1. f. 17, 18.*Olivella lineolata*, Adans., Gray.*Hab.* California.** *Shell grey, black-banded; aperture subovate.*

33. OLIVINA COLUMELLARIS.

Shell smooth.

Oliva columellaris, Sow. Tank. Cat. 34; Wood, Suppl. t. 4. f. 34; Duclos, Oliv. t. 2. f. 11, 12; Reeve, C. I. t. 23. f. 62.*Hab.* Peru.

34. OLIVINA ZONALIS.

Shell smooth, small.

Oliva zonalis, Lamk. no. 61; Gray, Beechey, Voy. 131. t. 36. f. 25; Duclos, Oliv. t. 1. f. 3, 4; Reeve, C. I. t. 29. f. 90.*Oliva attenuata*, Reeve, C. I. t. 29. f. 90.*Hab.* Mexico.

35. OLIVINA SEMISULCATA.

Shell, hinder half of the last whorl longitudinally grooved.

Oliva semisulcata, Gray, Beechey, Voy. 130. t. 36. f. 10; Reeve, C. I. t. 33. f. 61.*Hab.* West Columbia.

* Many of the names of the shells in Wood's Suppl. were arbitrarily altered by the late Dr. Goodall as the work passed through the press, overlooking the fact that some of them had been established by prior publication.

36. OLIVINA ZANOËTA.

Blackish, with a subcentral white band.

Olivina zanoëta, Duclos, Oliv. t. 2. f. 9, 10; Reeve, C. I. t. 26. f. 76.

10. SCAPHULA.

Shell ovate, spire conical, sutural groove open to the apex; aperture ovate; inner lip rather expanded, thickened, defined, smooth, with two small plaits in front; anterior belt very narrow. Foot (*Olivina biplicata* or *auriculata*?) rather short, about the length of the shell, broad, much dilated on the sides and covering the whole of the shell; the front lobes very large, broad, oblong, rounded on the sides. Head hidden. Tentacles none. Eyes none. Operculum none. Animal pale grey-brown, not spotted.

1. SCAPHULA BIPLICATA.

Grey-brown; inner lip white; spire conical; suture dark brown.

Olivina biplicata, Sow. Tank. Cat. 33; Duclos, Oliv. t. 3. f. 9, 10; Reeve, C. I. t. 20. f. 48.

Olivina nux, Goodall, Wood, Cat. Supp. t. 4. f. 33.

Olivancilla auricularia, D'Orb. Voy. Amér. Mérid. 421. t. 59. f. 20-22 shell (animal?).

Though M. D'Orbigny in his text correctly described *Olivina auricularia* of Lamarck, yet in his figure of the animal he represents the shell of *Olivina biplicata*, which does not even answer to the character of the genus to which he refers it; M. Deshayes has referred both animal and shell to that species (see Lamk. Hist. ed. 2. x. 634).

M. Duclos to obviate the inconsistency—on what authority I do not know—in his enlarged copy of M. D'Orbigny's figure of the animal, places on it a figure of the shell of the true *Olivina auricularia* of Lamarck!

It must be left to succeeding naturalists to discover if the animal figured by M. D'Orbigny is that of *O. biplicata* or *O. auricularia*. My genus *Scaphula* was established on D'Orbigny's account of the animal.

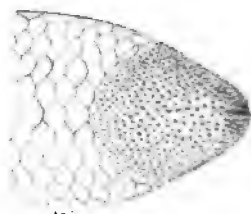
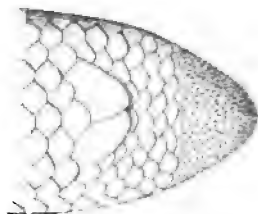
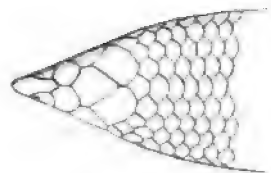
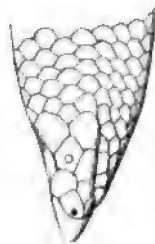
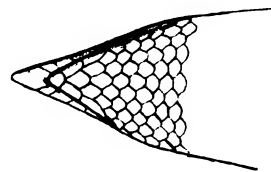
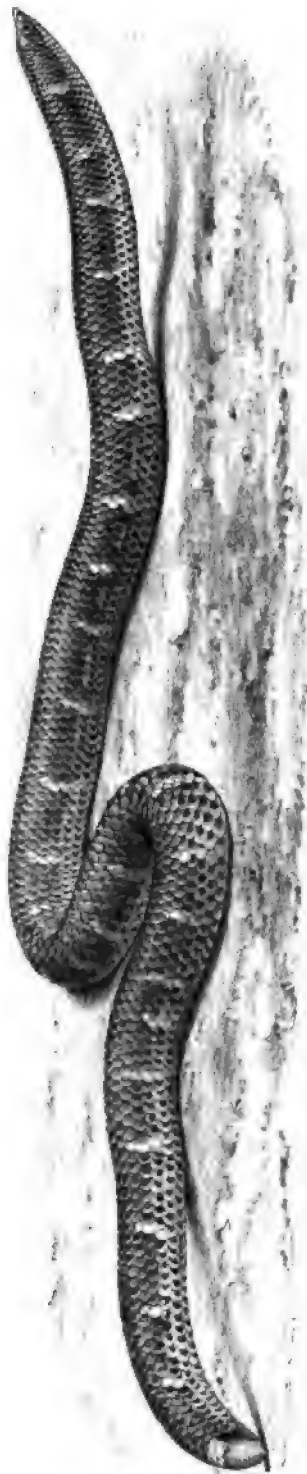
2. SCAPHULA ROSALINA.

White, with distant zigzag yellow lines; front of pillar rose-coloured.

Olivina rosalina, Duclos, Oliv. t. 1. f. 1, 2; Reeve, C. I. t. 30. f. 99.

11. MICANA.

Shell ovate or obconic; spire conical, callous; upper sutural groove obliterated; aperture ovate; inner lip thickened, expanded; pillar with two small grooves in front; anterior belt narrow, single. Animal —? Operculum half-ovate, horny.



1. MICANA NANA.

Voluta nitidula, Soland. MSS. ; Dillw. R. S. 521.*V. utriculus*, var., Gmelin, E. M. t. 363. f. 4.*Oliva nana*, Lamk. no. 60 ; Duclos, Oliv. t. 25. f. 5-8, oper. A. B ;
Reeve, C. I. t. 23. f. 66.*V. Ispidula*, var., Born.*Oliva micans*, Desh.*Voluta micans*, Soland. MSS. ; Dillw. R.S. 521 ; E. M. t. 363. f. 3.*Oliva millepunctata*, Duclos, Oliv. t. 25. f. 1-4 ; Reeve, C. I.
t. 28. f. 87.*Oliva oryza*, Lamk. no. 62 ; Duclos, Oliv. t. 1. f. 9, 10.*Voluta oryza*, Dillw. R. S. 522.*Oliva rufifasciata*, Reeve, C. I. t. 28. f. 88.*Hab.* West Indies.

January 26, 1858.

P. L. Sclater, Esq., F.L.S., in the Chair.

The following papers were read :—

1. NOTICE OF A NEW GENUS OF UROPELTIDÆ FROM CEYLON, IN
THE COLLECTION OF THE BRITISH MUSEUM. BY DR. J. E.
GRAY, F.R.S., V.P.Z. AND ENT. SOC. ETC.

!(Reptilia, Pl. XIII.)

In examining the reptiles recently acquired in the British Museum, Mr. Edward Gerrard observed a Saurian from Ceylon, which he believed to be new. I have great pleasure in sending a description of it to the Society, and in naming it after Mr. Gerrard, the preparer of the osteological specimens and of the animals in spirits in the British Museum, who has a most extraordinary empirical knowledge of the osteology of the different vertebrated animals and of the species of reptiles and fish.

MITYLIA, n. g.

Head tapering in front, acute ; rostral scale produced, compressed, acute, bluntly keeled above and below. Tail very short, subconical, rounded, covered with very close-set rough scales, each marked with two slight ridges of small asperities, with a central terminal rough oblong plate furnished with a perpendicular blunt keel ; subcaudal shields in five rows, central series rather wider, six-sided ; vent with two shields in front, and one in front of them between their base.

MITYLIA GERRARDI. (Pl. XIII.)

Black ; sides with a series of short white perpendicular bands ; underside white, with a black spot in the middle of each scale, a white oblong four-sided spot over the base of the caudal rugosity ; subcaudal scales few, with a small black spot in the centre of each.

Hab. Ceylon.

The form of the head agrees with the genus *Rhinophis* of Wagler ; but it differs from that genus in the shortness, and especially in the structure, of the caudal shield, which, in that genus, is formed of a single horny conical plate.

**2. NOTICE OF THE BOSCH VARK (POTAMOCHÆRUS AFRICANUS),
LIVING IN THE GARDENS OF THE SOCIETY. BY DR. J. E.
GRAY, F.R.S., V.P.Z.S., ETC.**

(Mammalia, Pl. LIX.)

It was with great pleasure I was able to examine a living specimen of the *Bosch Vark* from the Cape of Good Hope, as some zoologists who had lived at the Cape had expressed to me a doubt as to the distinctness of the Painted Pig of the Camaroons from the *Bosch Vark* of the Cape, which they informed me is apt to vary in colouring, being sometimes fulvous.

Any one who examines the two living animals as they are now placed, in two paddocks side by side in the Gardens, must at once be satisfied of the distinctness of the species of the two animals, quite independent of any variation that may occur in the ground colour of the individuals, and at the same time be convinced of their distinctness from the other pig and of their alliance to each other. Their differences may be thus stated in parallel columns :—

P. AFRICANUS, S. Africa.

The hair very long, blackish.

The nuchal crest very large, bushy, and extending over the shoulder.

Tail slender, placed rather high up.

The ears moderate, rather broad, with a small pencil at the tip.

P. PENICILLATUS, W. Africa.

The hair short, adpressed, deep red.

The nuchal crest small, low, white, forming a narrow line.

Tail very thick, placed very high up in the haunches.

The ears large, elongate, narrow, with a large terminal pencil.

These descriptions were taken at the same time of the year.

The two sexes of the two species are similarly coloured and agree in the above characters. There are also several other distinctive characters not so easily described.

3. NOTES ON A COLLECTION OF BIRDS RECEIVED BY M. VERREAUX OF PARIS FROM THE RIO NAPO IN THE REPUBLIC OF ECUADOR. BY PHILIP LUTLEY SCLATER, M.A., F.L.S. ETC.

(Aves, Pl. CXXXII.)

Some time since I had the honour of directing the attention of this Society to a collection of birds belonging to Mr. Gould, which had been formed on the upper Rio Napo, in the province of Quixos, in the eastern part of the republic of Ecuador*. Several other small collections have lately come into the possession of Sir William Jardine and Mr. Gould from the same country, to all appearances prepared by the same hand; but there has been nothing very striking in the way of novelties amongst them, with the exception perhaps of a new Motmot (*Momotus æquatorialis*, Gould, P. Z. S. 1857, p. 223) and one or two scarce species of Toucan.

Judging from the labels on some of these specimens, I am led to believe that they were collected by a physician and naturalist named Villavicencio, lately resident at Puerto del Napo, where he is spoken of by the great Italian traveller Osculati in his 'Esplorazione delle Regioni Equatoriali†,' and to whom M. Bourcier has dedicated the beautiful Humming-bird called *Helimaster villavicencii*. I am glad of this opportunity of stating that I have been informed that this gentleman is now on his way to Europe, with the object of publishing maps of the republic of Ecuador, and giving to the world an account of his discoveries in that little-known country.

M. Verreaux's fine series of birds—embracing upwards of 170 species, a part of which I now have the pleasure of exhibiting to this Society—has evidently been formed in nearly the same locality as those which I have just mentioned, and contains specimens of most of the species which I have previously noticed as coming from this quarter. There are, however, many additional species, and upwards of twenty which I consider unnamed, and have accordingly described as new, and among these are several very peculiar forms. M. Verreaux, knowing the interest which I take in tracing the range of species, has kindly transmitted to me a perfect series, and I have thought it desirable to give a complete list of them, in order to show the general character of the *Avi-fauna* of this country.

M. Jules Verreaux carefully examined the whole of these birds before they left his brother's hands, labelling nearly every species, and thus greatly lightening the severe labour of finding correct names for so large a collection. In the case of the new species I have always adopted his MS. names, and in this, as in other instances, have seldom found it necessary to disagree from the results at which he has arrived.

The most noticeable things in the collection are two Tanagers, which seem to be not only specifically but generically different from

* See P. Z. S. 1854, p. 109 *et seq.*

† Esplorazione delle Regioni Equatoriali lungo il Napo ed il fiume delle Amazzoni, da Gaetano Osculati. Ed. 2. Milano, 1854, 1 vol. 8vo.

anything hitherto known ; the fine series of *Formicariidæ*, embracing upwards of thirty species, of which several appear to be undescribed ; and a new bird of the peculiar South American family *Pteroptochidæ*, forming a link between *Merularis* and *Scytalopus*.

1. *ROSTRHAMUS SOCIABILIS* (Vieill.), Bp. Consp. i. p. 20 ; Strickl. Orn. Syn. p. 136, juv.

2. *SCOPS* — ?

This bird seems certainly different from any of the S. American members of the genus with which I am acquainted, and M. Jules Verreaux has attached a new name to it, considering it to be undescribed. Although several naturalists have paid much attention to the *Strigidæ* of late years, there is still much confusion in several of the groups as to the distinctness of the different species, and in none perhaps more than in the difficult genus to which this bird belongs. I am therefore unwilling to describe the present example as new until I can give a general review of all the American species of the genus.

3. *ACANTHYLIS ALBICOLLIS* (Vieill.), Sclater, P. Z. S. 1854, p. 110.

4. *TROGON VIRIDIS*, Linn. ; Bp. Consp. p. 148. — *T. melanopterus*, Gould, Mon. pl. 10, 11.

5. *TROGON RAMONIANUS*, Dev. & DesMurs, Rev. et Mag. de Zool. 1849, p. 331 ; Voy. Castelnau, Zool. Ois. p. 33. pl. 11. fig. 2.

6. *PHAROMACRUS ANTISIENSIS* (D'Orb. & Lafr.).—*Calurus pulchellus*, Gould.

7. *PHAROMACRUS AURICEPS* (Gould), Bp. Consp. p. 152.

8. *BUCCO HYPERRHYNCHUS*, Sclater, P. Z. S. 1855, p. 193. pl. cv.

9. *BUCCO MACRODACTYLUS* (Spix), Sclater, Syn. of Bucc. p. 14.

10. *MALACOPTILA UNITORQUES*, DuBus.

I am still doubtful about the real specific distinctness of this species and *M. nigrifusca* from *M. fusca* of Cayenne. See my remarks in P. Z. S. 1855, p. 195.

11. *NONNULA FRONTALIS*, Sclater, Mon. Bucc. p. 20.

A specimen apparently referable to this Bogota species, but without any appearance of the rufous front of the adult.

12. *MONASA PERUANA*, Sclater, P. Z. S. 1855, p. 194.

13. *MONASA NIGRIFRONS*, Spix.

14. **GALBULA LEUCOGASTER**, Vieill.—*G. chalcothorax*, Sclater, P. Z. S. 1854, p. 110.

I believe I was in error in separating the bird from Quixos from *G. leucogastra*. A more mature specimen in the present collection seems to be not different from the latter species.

15. **MOMOTUS SEMIRUFUS**, Sclater, P. Z. S. 1857, p. 254.

16. **MOMOTUS ÆQUATORIALIS**, Gould, P. Z. S. 1857, p. 223.

17. **DACNIS CAYANA** (L.) ♀, P. Z. S. 1854, p. 252.

18. **CHLOROPHANES ATRICAPILLA**, Vieill.

19. **ANABATES LINEATICEPS**, Sclater, Ann. Nat. Hist. June 1856.

20. **ANABATES INFUSCATUS**, Sclater, Ann. Nat. Hist. June 1856.—*A. amazonus*, Lafr. MS.

These two birds agree well with the types of my descriptions in my own collection, which were procured on the Upper Amazon. The former bird is also among the species collected by Hauxwell on the Ucayali, one of whose specimens is now in the British Museum.

21. **ANABATES RUFICAUDATUS**, Lafr. et D'Orb. Syn. Av. in Mag. de Zool. 1838, p. 15.

22. **ANABATES ERYTHROPTERUS**, Sclater, P. Z. S. 1856, p. 27.

Both these two birds agree with Bogota skins.

23. **ANABATES MELANORHYNCHUS**, Tsch. Faun. Per. p. 35. pl. 21. fig. 1 (teste Lafresnaye).

24. **ANABATES MELANOPEZUS**, sp. nov.

Supra saturate umbrino-brunneus, uropygio rufescente, cauda pure rufa: subtus pallide cinerascens-brunneus, medialiter dilutior; gula albicantiore sed rufo lavata; crisso rufescente; tectricibus subalaribus cum remigum intus nigricantium parte vicina late rufis: rostro nigro, gonyde pallescente; pedibus nigricanti-plumbeis.

Long. tota 7·0, alæ 3·2, caudæ 3·0.

This species is very closely allied to Tschudi's *A. ochrolæmus*, with which it has been identified by M. de Lafresnaye. But as I have in my collection one of Tschudi's original specimens (of *A. ochrolæmus*), I am enabled to affirm that the two birds, though much resembling one another, cannot be considered as of the same species. Their upper surfaces are much alike; but beneath, the present bird is of a very pale ashy-brown, while *A. ochrolæmus* is nearly as dark below as above. In *A. melanopezus* the bill is shorter, stouter, and nearly all black, and the feet are blackish lead-colour; in *A. ochro-*

læmus the bill is thinner and more elongated, yellowish, with the culmen horn-colour, and the feet are pale brown.

25. *ANABATES PYRRHODES*, Cab. in Schomb. Guian. iii. p. 689.—*A. ochraceus*, Lafr. MS.

A specimen referable, as I believe, to this species, of which I have seen examples in the Paris Museum and in the collection of the Academy at Philadelphia, is marked "*A. ochraceus*, Lafr."

26. *ANABATES GUTTURATUS*, Lafr. et D'Orb. Syn. Av. in Mag. de Zool. 1838, p. 14 (teste Lafresnayo).

27. *ANABATES PULVERICOLOR*, sp. nov.—*Synallaxis pulvericolor*, Lafr. MS.

Terricolori-brunneus, interscapulio saturatiore, subtus dilutior, alis extus et cauda omnino rufis: rostro brevi, paulum incurvo, albo; pedibus robustis, plumbeis.

Long. tota 6·2, alæ 2·6, caudæ 2·8; tarsi 0·8, rostri a fronte 0·5.

A single bad specimen of this species belonging to M. de Lafresnaye, and kindly lent to me by him along with other specimens selected from this collection, bears the MS. name *Synallaxis pulvericolor*. It appears, however, to me to be better placed with *Anabates*, and more nearly resembles the figure given in Buffon's Pl. Enl. of *Anabates guianensis*, which is the type of the genus, than anything I have yet seen. Had it been from Guiana instead of the Rio Napo, I should have thought it was probably referable to that long-lost species.

It certainly is not a typical *Anabates*, speaking of the set of birds commonly so called, the bill being shorter, straighter, and smaller than in these birds generally, though not very different from that of *Anabates erythrophthalmus*, but it is more nearly allied to *Anabates* than to any species of *Synallaxis* with which I am acquainted.

28. *SCLERURUS BRUNNEUS*, Sclater, P. Z. S. 1857, p. 17.

Agrees with my specimen from Bogota, and confirms my impression as to the validity of this species.

Long. tota 6·2, alæ 3·0, caudæ 2·3, rostri a fronte ·8, a rictu 1·1, tarsi ·9.

29. *SYNALLAXIS BRUNNEICAUDALIS*, sp. nov.—*Synallaxis brunneicauda*, Lafr. MS.

Supra olivaceo-brunnea, alis extus et pileo castaneis, subtus obscure cinerascens, lateribus olivaceo indutis: caudæ rectricibus decem, colore saturate purpurascenti-brunneis, plumarum scapis nigris: tectricibus subalaribus ochraceo-flavis: rostro nigro, gonydis basi albicante: pedibus brunneis.

Long. tota 6·5, alæ 2·4, caudæ 2·7, rostri a fronte ·6, tarsi ·95.

A fine large *Synallaxis*, for which I have employed M. de Lafres-

naye's MS. name. The only adult specimen is in bad condition. Both the examples belong to M. de Lafresnaye's collection.

30. *SYNALLAXIS ALBIGULARIS*, sp. nov.—*Synallaxis albigula*, Lafr. MS.

Supra murino-brunnea; cauda concolore; pileo postico et tectricibus alarum extus rufis: lateribus capitis et corpore subtus cinereis: loris albidis: gula et ventre medio pure albis, lateribus et crisso brunnescenti-cinereis: rostri nigricantis gonyde albicante: pedibus clare brunneis.

Long. tota 5·5, alæ 2·3.

A short-tailed species of *Synallaxis*, as I should judge from the only specimen under observation, in which, however, the medial rectrices are absent. It is very nearly allied to Temminck's *S. albescens*, but differs sufficiently in its white throat and belly, as far as I can judge from the unique specimen.

31. *XENOPS GENIBARBIS*, Temm.?

An imperfect specimen.

32. *DENDRORNIS PALLIDIROSTRIS*, Lafr.

"Affinis *D. chuncotambo*, Tsch."—*Lafr.*

33. *DENDRORNIS BREVIROSTRIS*, Lafr.

34. *PICOLAPTES ALBO-LINEATUS*, Lafr. Rev. Zool. 1848, p. 208.

35. *XIPHORHYNCHUS GRENADENSIS*, Lafr.

36. *DENDROCOLAPTES ATRIROSTRIS*, Lafr. et D'Orb.; Lafr. Rev. et Mag. de Zool. 1851, p. 466.

37. *GLYPHORHYNCHUS CUNEATUS*, Bp. Consp. p. 209?

I am not certain whether characters of species 32, 33 and 35 have yet been published or not; but as M. de Lafresnaye has worked so energetically at this group of birds, I am unwilling to anticipate him by publishing descriptions of birds which bear his names.

TROGLODYTINÆ.

38. *CYPHORINUS MODULATOR* (D'Orb.).

Thryothorus modulator, D'Orb. Voy. p. 230.—*Sarochalinus rufularis*, DesMurs in Casteln. Voy. Ois. p. 49. pl. 17. fig. 2.

39. *CYPHORINUS LEUCOSTICTUS*, Cab. Orn. Not. i. p. 206?

This species is very nearly resembling, but not perhaps quite identical with, my *Scytalopus prosthaleucus* from Mexico, P. Z. S. 1856, p. 290. I was quite wrong in referring this latter bird to the genus *Scytalopus*, that form with its closed nostrils belonging to the *Pteroptochidæ* (a name which I propose to substitute for Lafresnaye's term *Rhinomydæ*); while the *Cyphorini*, presenting a somewhat

similar outward appearance, but readily distinguishable upon close examination, are true Wrens in structure. The same observation may be made of Lafresnaye's *Scytalopus griseicollis* from Bogota. Cabanis gives Guiana and Mexico as localities for his *C. leucostictus*; if the birds from these two localities are not identical (as I think is likely to be the case), the S. American bird may retain Cabanis's name, and the Mexican species be called *Cyphorhinus prosthaleucus*. The specimens in the present collection differ from the Mexican bird in their rather larger size, longer bill, and the deeper chestnut of the back and upper wing-coverts, which latter are not nearly so much spotted with white.

40. *THRYOTHORUS CORAYA* (Gm.).

Rather darker head, but hardly distinct from the Cayenne bird.

41. *MYIODIOCTES CANADENSIS* (Linn.).

42. *RHIMAMPHUS BLACKBURNIÆ*, juv.

43. *RHIMAMPHUS CÆRULEUS* (Linn.), juv.

44. *TURDUS MINIMUS*, Lafr.

45. *TURDUS PHÆOPYGOS*, Cab. in Schomb. Guian. iii. p. 666.

Back slightly darker, but not apparently otherwise different.

46. *MALACOCICHLA MACULATA*, sp. nov.

Catharus maculatus, J. Verreaux, MS.

Supra nigricanti-schistacea, pileo toto cum capitis lateribus nigerimis: subtus ochraceo-albida, lateraliter schistacea: gula et pectore summo triangulariter nigro maculatis, maculis quoque in ventris lateribus rotundis, obsolete schistaceis: tectricibus subalaribus nigro-schistaceis: rostro et pedibus flavis.

Long. tota 7·0, alæ 3·6, caudæ 2·8, rostri a fronte ·6, a rictu ·85, tarsi 1·4.

This interesting bird is a close ally of Gould's *Malacocichla dryas* from Guatemala, and I have therefore placed it in the same genus. It may be distinguished from that species by the dark slaty colour of the back, which in *M. dryas* is greenish olive. Whether these birds will be ultimately separable from the genus *Catharus* is, I think, questionable; and M. Jules Verreaux is therefore quite as likely to be correct in his appellation of this species as I am in mine. Besides *M. dryas* from Guatemala (P. Z. S. 1854, p. 285, pl. 75), Prince Bonaparte has described a Mexican species—*M. mexicana* (Compt. Rend. Aug. 2, 1856). The Prince also informed me (after a visit to M. de Lafresnaye's collection, which he made shortly before his decease) that *Myioturdus fuscater*, Lafr. R. Z. 1845, p. 341, belongs to this same genus—so that this is probably the fourth species known.

47. *CYMBILANIUS LINEATUS* (Leach), ♂ et ♀.
48. *THAMNOPHILUS MELANURUS*, Gould, P. Z. S. 1855, p. 69. pl. 83.
49. *THAMNOPHILUS CORVINUS*, Gould, P. Z. S. 1855, p. 69.
50. *THAMNOPHILUS MELANOCEPS*, Spix, Av. Bras. ii. p. 28. pl. 39. fig. 1; Sclater, P. Z. S. 1857, p. 133.
51. *THAMNOPHILUS MACULIPENNIS*, Sclater, Edinb. Phil. Journ. i. p. 247.

52. *THAMNOPHILUS ÆTHIOPS*, sp. nov.

♂. *Ater unicolor; campterio et tectricibus subalaribus albo variegatis: rostro et pedibus nigerrimis.*

♀. *Castaneo-brunnea unicolor, alis intus obscurioribus, maculis quibusdam tectricum superiorum majorum apicalibus cum camp-
terii margine et tectricibus subalaribus flavicanti-rufis: cauda
nigra: rostro et pedibus nigris.*

Long. tota 6·0, alæ 2·8, caudæ 2·5, rostri a rictu ·85, tarsi ·9.

This species is in colour like *T. immaculatus*, of a uniform black; but, whilst that has only a very insignificant white patch on the bend of the wing, the *T. æthiops* has the under wing-coverts as well as the upper coverts close to the bend varied with white. Besides, the bill is much shorter and stouter, and the whole bird is smaller in its dimensions. Of *T. immaculatus* I make the corresponding measurements:—Long. tota 7·0, alæ 3·3, caudæ 3·0, rostri a rictu 1·0, tarsi 1·3.

53. *THAMNOPHILUS CAPITALIS*, sp. nov.

♂. *Cinereus, alis intus obscurioribus: pileo nigro; subtus dilu-
tior, tectricibus subalaribus et marginibus remigum interioribus
ochraceo-albidis: cauda nigricante: rostro et pedibus
plumbeo-nigris.*

♀. *Umbrino-brunnea; pileo rufo; subtus dilutior, gula albican-
tiore: rostro pedibusque plumbeis, illius mandibula inferiore
pallidiore.*

Long. tota 5·7, alæ 2·5, caudæ 2·0, tarsi ·75.

This *Thamnophilus* belongs to the typical division of the group which contains *T. navius* and its allies. It is easily distinguishable by its uniform cinereous plumage and black head, with the absence of all markings on the wings and tail. M. Verreaux's collection contains a male not quite adult and two females of this species.

54. *THAMNOPHILUS STRIGILATUS*, Spix, Av. Bras. ii. pl. 36. fig. 1?

Apparently a female of some species of this genus. A large light-chestnut blotch occupies the base of the back feathers, which are inordinately thickened.

55. *DYSITHAMNUS SCHISTACEUS* (D'Orb.).—*Thamnophilus schistaceus*, D'Orb. Voy. p. 170. pl. 5. fig. 1.

♂. *Obscure cinereus, subtus vix dilutior, macula parva sub dorsi medii pennis et rectricum margine apicali angusta albis : rostro et pedibus nigris.*

♀. *Obscure brunnea, subtus flavicanti-rufescens, gula albicante ; alis caudaque nigricanti-fuscis, rectricum margine apicali rufescenti-alba.*

Long. tota 5·5, alæ 2·8, caudæ 1·9, tarsi ·75.

Obs.—Affinis *D. plumbeo* ex Brasilia, sed alis concoloribus neque albo marginatis.

I refer this bird with some doubt to D'Orbigny's species.

56. *DYSITHAMNUS LEUCOSTICTUS*, sp. nov.

Supra umbrino-brunneus, pileo rufescentiore, pennis omnibus interne cinereis : subtus cinereus, capitis lateribus cum gula et pectore guttis elongatis albis, pennas medias occupantibus, maculatis : ventri lateribus et crisso olivaceo tinctis : cauda obscure nigra, extus brunneo marginata : rostro et pedibus nigris.

Long. tota 5·2, alæ 2·75, caudæ 2·0, tarsi 1·85.

This species is noticeable on account of the clear white elongated shaft-spots on the throat and breast, which distinguish it from other birds of the group. In two younger specimens in MM. Verreaux's collection these spots are hardly yet apparent, and the rich brown edging of the upper plumage is only partly assumed, leaving these parts of a brownish cinereous.

57. *DYSITHAMNUS SEMICINEREUS*, Sclater, P. Z. S. 1855, p. 90. pl. 97, ♀.

58. *PYRIGLENA SERVA*, sp. nov.

♂. *Nigra, subtus magis ardesiaca : macula magna interscapularium interna et tectricum alarium superiorum marginibus apicalibus cum campterio albis ; rostro et pedibus nigris.*

♀. *Olivascenti-cinerea, macula interscapularium interna alba : subtus saturate ferruginea ; alis caudaque fuscis, tectricum alarium superiorum marginibus et tectricibus subalaribus rufescentibus ; rostro superiore nigro, inferiore flavido : pedibus fuscis.*

Long. tota 5·3, alæ 2·5, caudæ 2·3, rostri a rictu 0·8, tarsi 0·9.

Distinguished from *Pyriglena domicella* and *P. atra* by its smaller size. Sir William Jardine recently lent me some specimens of *Formicariidæ* from Quixos, among which were examples of both sexes of this same species. I do not know *Lanius funebris*, Licht. (Doubl. p. 47), from Cayenne, but as far as I can judge from his short characters, it can hardly be identical with the present bird.

59. *PYRIGLENA QUIXENSIS* (Cornalia).—*Thamnophilus quixensis*, Corn. Vert. Syn. p. 12.—*Pyriglena quixensis*, Sclater, P. Z. S. 1854, p. 112.

60. *PYRIGLENA RUFIVENTRIS* (CORN.).—*Thamnophilus rufiventris*, CORN. Vert. Syn. p. 12.—*Pyriglena rufiventris*, SCLATER, P. Z. S. 1854, p. 112.

Probably the female of the preceding.

61. *THAMNOMANES GLAUCUS*, Cab. Orn. Not. i. p. 230; Bp. Consp. i. p. 201?

62. *FORMICIVORA CINERASCENS*, SCLATER, P. Z. S. 1857, p. 131.

This specimen agrees perfectly with others from the same locality, except in the absence of all edgings to the wing-coverts.

63. *FORMICIVORA HAUXWELLI*, SCLATER, P. Z. S. 1857, p. 131. pl. cxxvi. fig. 2, ♂ et ♀.

64. *FORMICIVORA MENETRIESI*.

Myrmothera menetriesi, D'ORB. Voy. Am. MÉR. OIS. p. 184.

65. *FORMICIVORA PYGMÆA* (GM.), BUFF. Pl. ENL. 831. fig. 2, ♂ et ♀.

66. *FORMICIVORA CAUDATA*, SCLATER, P. Z. S. 1854, p. 254, pl. 74, juv.

67. *HYPOCNEMIS MYIOTHERINA* (SPIX); SCLATER, P. Z. S. 1855, p. 146.

68. *HYPOCNEMIS MELANOSTICTA*, SCLATER, P. Z. S. 1854, p. 234. pl. lxxiii.

69. *HYPOCNEMIS THERESÆ* (DES MURS).

Conopophaga theresæ, DES MURS, Voy. CASTELN. OIS. p. 51. pl. 16. fig. 2.

70. *HYPOCNEMIS ORNATA*.—*Formicivora ornata*, SCLATER, Rev. et Mag. de Zool. 1853, p. 480, ♂ et ♀.

71. *HYPOCNEMIS CANTATOR* (BODD.), Pl. ENL. 700, ♀.

72. *HYPOCNEMIS PÆCILONOTA*, Cab. Orn. Not. i. p. 213. pl. 4. fig. 2, ♀.

73. *PITHYS ALBIFRONS* (GM.), Pl. ENL. 707. fig. 1.

74. *HETEROCNEMIS ALBIGULARIS*, sp. nov.

Brunnescenti-olivaceus, plumis omnibus nigro obsolete marginatis, alis caudaque nigricantibus; fascia alarum duplici alba: subtus pallide cinerascens, gutture albo, ventre nigricante transversim lineato: rostro nigro, mandibulæ inferioris basi albido: pedibus fuscis.

Long. tota 4·2, alæ 2·35, caudæ 0·9, rostri a rictu 0·9, tarsi 1·0.

Obs.—Affinis *H. bamblæ* ex Cayenna, sed crassitie paulo majore, rostro longiore et gula alba dignoscenda.

75. *CONOPOPHAGA TORRIDA*, sp. nov.

Clare brunnescenti-olivacea, dorsi plumis nigro partim variegatis; capite supra, alis et cauda ferruginescenti-brunneis: tectricibus alarum et secundariis extus macula apicali fulvo-flavida ornatis: plumarum fasciculo postoculari albo: subtus clare ferruginea, gula et ventre medio albicantibus, hypochondriis et ventre imo magis fulvis: mandibula superiore nigra, inferiore cornea: pedibus pallidis.

Long. tota 4·6, alæ 2·8, caudæ 1·2, tarsi 1·0.

M. Verreaux's collection contained a single specimen of this apparently new *Conopophaga*, not in very good plumage. A more perfect example in the British Museum, which is from Chamicurros in Eastern Peru, has furnished my specific characters.

This is a typical species of the genus somewhat allied to *C. lineata* of South-eastern Brazil.

76. *CONOPOPHAGA PERUVIANA*, DesMurs, Voy. Casteln. Ois. p. 52. pl. 16. fig. 1.

77. *FORMICARIUS NIGRIFRONS*, Gould, P. Z. S. 1855, p. 68.

78. *FORMICARIUS ANALIS* (Lafr. et D'Orb.), D'Orb. Voy. pl. 6 bis, fig. 1.

79. *FORMICARIUS NIGRO-MACULATUS* (Lafr. et D'Orb.), D'Orb. Voy. Ois. pl. 6*.

80. *CHAMÆZA NOBILIS*, Gould, P. Z. S. 1855, p. 68.

81. *GRALLARIA FLAVIROSTRIS*, sp. nov.

Brunnescenti-olivacea, loris et capitis lateribus rufescentibus: subtus alba, pectoris medii et lateralis plumis pallide rufis, utrinque nigro late limbatis, quasi squamatis; gulæ laterum plumis rufo tinctis, fascia nigricante intus marginatis; tectricibus subalaribus pallide rufis; rostro flavo; pedibus clare brunneis.

Long. tota 4·2, alæ 2·7, caudæ 1·1, tarsi 0·9, rostri a rectu 0·7.

This diminutive *Grallaria* is very like the Venezuelan bird which I described in the Proceedings for last year (P. Z. S. 1857, p. 129) under the name *G. loricata*. Like that, it has a pectoral band formed by the black margins of the pale rufous feathers; but in the present species the band is much narrower, and the head is not chestnut.

82. *GRALLARIA FULVIVENTRIS*, sp. nov.

Olivaceo-brunnea, pileo obscuriore, alis extus magis rufescentibus, loris albidis: subtus gula et abdomine medio albis, pectore, ventri lateribus et crasso cum tectricibus alarum inferioribus

saturate fulvis, pectore lineis quibusdam nigris variegato : rostro superiore nigro, inferiore, nisi apice, flavo : pedibus pallide brunneis.

Long. tota 5·5, alæ 3·2, caudæ 1·4, tarsi 1·5, rostri a rictu 0·95.

This *Grallaria* seems to belong to a species distinct from anything yet described. The bird most resembling it of those I have met with, is *G. macularia*, of which there are specimens in the Leyden Museum; but that is rather a peculiar species, remarkable for its denuded orbits and short, strong hind-nail, while this bird has the hind-nail slender and rather long, and is in every respect a typical member of the genus.

Genus novum AGATHOPUS.

Rostrum modicæ longitudinis, brevius quam caput, subulatum, culmine recto, ad apicem paulum incurvo, gonyde ascendente, mandibula superiore ad apicem dentata, naribus, prout in omnibus hujus familiæ generibus, coopertis : alæ brevissimæ, rotundatæ, remige septima sextam et quintam paulo excedente et longissima, tertia secundarias æquante : pedes validi, tarsi longis, antice scutellis novem regularibus, postice scutellis minutis, tecti ; unguibus curvatis, acutis ; cauda modicæ longitudinis, multum rotundata, rectricibus duodecim, extimis dimidio brevioribus, ceteris gradatim longioribus ; tectricibus supra-caudalibus densissimis.

83. AGATHOPUS MICROPTERUS, sp. nov.

Obscure nigricanti-schistaceus, dorso postico cum ventre imo, lateribus et crasso saturate brunneis, radiis transversis nigris, in tergo vix apparentibus, subobsolete variegatis : rostro nigro, pedibus clare brunneis.

Juvenis.—*Radiis transversis nigris omnino oblectus, gula magis cinerascens, et colore toto magis brunneo.*

Long. tota 3·3, alæ 2·3, caudæ 1·9, rostri a rictu ·7, tarsi 1·0.

This curious bird, of which the collection contains two examples, seems intermediate in form, as in size, between *Merulaxis atra* and the *Scytalopodes*. From the former it differs in the shape of the bill, which is shorter, has the gonys curved upwards, and wants the elevated feather-tufts on the front; from *Scytalopus* it is distinguished by its thicker, stronger and larger bill, longer tail, and longer tarsi. These genera, along with *Pteroptochus* and its allies, appear to me to constitute a well-distinguished group, for which, as I have said above, I propose to use the term *Pteroptochidæ*, deduced from the oldest and best-known genus (instead of Lafresnaye's name *Rhinomydeæ*) according to the orthodox rule for forming the names of families. The distinctions of these birds as a group are well pointed out in the Ornithology of D'Orbigny's Voyage (p. 192), and their most essential character, as is there stated, consists in the covered nostril, only a narrow longitudinal aperture being left, which occurs in every species. They must certainly be arranged next to the *Formicariidæ*, within the limits of which they have been placed by Cabanis and

other writers; and I am not myself certain that it may not be possible to consider them only as a subfamily belonging to that series.

84. *TODIROSTRUM CAPITALE*, Sclater, P. Z. S. 1857, p. 83. pl. 125. f. 2.

85. *TODIROSTRUM SQUAMICRISTATUM*, Lafr. R. Z. 1846, p. 363.

86. *TODIROSTRUM SPICIFERUM*, Lafr. R. Z. 1846, p. 363; P. Z. S. 1855, p. 67. pl. 84. f. 2.

In my communication on some new species of this genus in last year's Proceedings (p. 84), I have united this bird with *T. galeatum*, figured in Pl. Enl. 391. f. 1, from Cayenne. Mr. G. R. Gray has however pointed out to me specimens of both these species in the British Museum, whereby it clearly appears that I was in error in so doing. The two are certainly very nearly allied species, but *T. galeatum* (which appears to be the same as the bird denominated *Colopterus cristatus* by Cabanis) may be distinguished by having no edgings to the wing-coverts, and by the very peculiar abbreviation of the three first primaries.

87. *TODIROSTRUM PICATUM*, sp. nov.

Supra nigrum, lorīs et secundariarum trium ultimarum pogoniis externis cum macula rectricis unæ utrinque extimæ apicali albis, his flavicante tinctis; subtus album, tectricibus subalaribus et margine campterii flavicanti-albis: rostro superiore nigro, inferiore albo; pedibus pallide fuscis.

Long. tota 3·5, alæ 2·1, caudæ 1·3, rostri a fronte 6·0, tarsi 6·5.

This peculiar *Todirostrum* is quite unlike any other known member of the genus in colouring. In structure it is generally typical, but with the bill not quite so broad towards the apex as in some others.

88. *MYIOBIUS PHENICURUS*. — *Tyrannula phanicura*, Sclater, P. Z. S. 1854, p. 113. pl. 66. f. 1.

89. *MYIOBIUS* — ?

Affinis M. barbato, sed crassitie majore.

90. *MYIOBIUS ERYTHRURUS*, Cab. Orn. Not. p. 249. pl. 5. f. 1.

91. *TYRANNUS MELANCHOLICUS*, Vieill.

92. *CYCLORHYNCHUS ÆQUINOCTIALIS*, sp. nov.

Clare olivaceus, remigibus alarum nigricantibus flavicanti-viridi late limbatis; cauda fusca, rectricum marginibus dorso coloribus: subtus flavicans, gula grisescens; pectore et lateribus cum crasso olivaceo perfusis; tectricibus subalaribus sulphureis; rostro superiore nigro, inferiore albo; pedibus carneis.

Long. tota 6·0, alæ 2·6, caudæ 2·3, rostri a rectu 0·8, tarsi 0·7.

This bird is a close ally of the Brazilian *Cyclorhynchus olivaceus*, but may be distinguished by its shorter wings and tail, and by the pure yellow of the middle of the abdomen.

93. *PLATYRHYNCHUS CORONATUS*, Verreaux, MS.

Brunnescenti-olivaceus, alis caudaque fuscis, pilei cristati parte mediali flavissima laterali utrinque castanea; linea superciliari et altera a rictu descendente nigris; loris et corpore subtus cum tectricibus subalaribus sordide flavicantibus; rostro superiore nigro, inferiore albicante; pedibus pallide fuscis.

Long. tota 3·8, alæ 2·4, caudæ 1·2, rostri a rictu ·55, tarsi ·55.

This is a typical species of the genus *Platyrhynchus* with the bill nearly of the same breadth and shape as in *P. cancruma*, and of the general size and form of that species; but it is easily recognizable by its bright yellow crest being broadly margined with deep chestnut, and by the shorter and more slender tarsi. These two birds and *Platyrhynchus rostratus* are the only members of the group with which I am acquainted.

94. *ELENIA ALBICEPS* (Lafr. & D'Orb.).95. *ELENIA LUTEIVENTRIS*, sp. nov.

Supra fusca unicolor, alis caudaque paulo saturatioribus; gutture griseo, abdomine medio et crasso cum tectricibus alarum inferioribus sulphureo-flavis, pectore et lateribus oleagineis; rostro et pedibus nigris.

Long. tota 5·3, alæ 2·8, caudæ 2·3, tarsi 0·6.

A typical *Elenia* of the same form as *E. pagana*, the type of the genus, but of smaller size, and differing in colouring from all members of the group with which I am acquainted.

96. *LEPTOPOGON SUPERCILIARIS*, Cab. in Tsch. Faun. Per. pl. 10. f. 2. p. 161?97. *MIONECTES OLEAGINEUS* (Licht.); Bp. Consp. p. 187.98. *COPURUS LEUCONOTUS*, Lafr.

See P. Z. S. 1855, p. 148. The same as the Bogota bird.

99. *PACHYRHAMPHUS MARGINATUS* (Max.); P. Z. S. 1857, p. 77.100. *PACHYRHAMPHUS VERSICOLOR* (Hartl.); P. Z. S. 1857, p. 76.101. *LIPAUGUS FUSCO-CINEREUS* (Lafr.).102. *COTINGA MAYNANA* (Linn.) ♀?103. *CEPHALOPTERUS ORNATUS*, Geoffr.104. *RUPICOLA PERUVIANA* (Lath.) ♀.105. *CIRRHIPYRA FILICAUDA* (Spix) ♀.106. *PIPRA CORACINA*, Sclater, P. Z. S. 1856, p. 29.107. *PIPRA CORNUTA*, Spix ♀?

108. *PIPRA STRIOLATA*, Bp. Consp. p. 174 ♀.

109. *PIPRITES CHLORION*, Bp. Consp. p. 174 ?

I do not unfortunately possess, nor have I access to specimens of *Piprites chlorion* of Cayenne; so I may be in error in referring this bird to that species. It is however certainly different from *Piprites chloris* of Brazil, and therefore probably new, if not identical with *P. chlorion*.

110. *CYANOCORAX INCAS* (Bodd.); Pl. Enl. 625.

111. *CYANOCORAX VIOLACEUS*, DuBus; Bp. Consp. p. 379.

112. *CACICUS YURACARIUM*, D'Orb. & Lafr.; D'Orb. Voy. Ois. pl. 51. f. 1. p. 365.

113. *CACICUS CRISTATUS* (Gm.); Bp. Consp. p. 427.

114. *DOLICHONYX ORYZIVORUS* (Linn.) juv. ?

I have seen several S. American specimens of this bird, not apparently much differing from northern examples, though I think it very likely that they may eventually be found to belong to a different species. Dr. Hartlaub has hinted at its occurrence in Paraguay (Index to Azara, p. 9): my own specimens are from Bolivia and S. Martha, New Grenada, and it appears to have been procured by Darwin in the Galapagos islands.

115. *SPERMOPHILA LUCTUOSA*, Lafr. R. Z. 1843, p. 291, jun. ?

116. *SALTATOR MAGNUS* (Gm.).

117. *SALTATOR AZARÆ*, D'Orb.

Nearly agreeing with Bolivian specimens in the British Museum, which I refer to D'Orbigny's species; but a shade darker on the back.

118. *BUARREMON BRUNNEINUCHUS* (Lafr.).

119. *ARREMON SPECTABILIS*, Sclater.

120. *CHLOROSPINGUS* — ?

An immature bird, and bad skin.

121. *EUCOMETIS ALBICOLLIS* (Lafr. & D'Orb.); Sclater, P. Z. S. 1856, p. 117 (?).

It will be necessary to compare this specimen with the type in the Paris Museum before it can be referred without doubt to D'Orbigny's species.

122. *LANIO ATRICAPILLUS* (Gm.) ♀ ?

123. *CREURGOPS VERTICALIS*, sp. et gen. novum. (Pl. CXXXII. fig. 2.)

CREURGOPS*, genus novum, Lanioni et Trichothraupidi affine, sed rostro diverso. Rostrum breve, crassum, culmine versus apicem incurvo, gonyde vix ascendente, commissura modice arcuata, mandibula superiore dente mediali distincto et altero finali instructo; vibrissis rictalibus nonnullis: alæ modicæ, caudæ tertiam partem attingentes, remigibus secunda, quarta et quinta æqualibus et longissimis, prima his paulo brevior: cauda longa, apice quadrata.

CREURGOPS VERTICALIS, J. Verreaux, MS.

Supra fuscescenti-schistacea, pileo semicristato saturate ferrugineo, hujus lateribus cum fronte nigricantibus: alis caudaque fusco-nigris; subtus ferruginescenti-ochracea: rostro nigricante, gonydis basi albida, pedibus fuscis.

Long. tota 6·2, alæ 3·2, caudæ 2·5, rostri a rictu 0·7, tarsi 0·85.

This peculiar Tanager seems to belong to the neighbourhood of *Lanio*, *Tachyphonus* and their allies, and, like the former, has a very sharply defined notch about two-thirds of the distance along the edge of the upper mandible. But the bill is otherwise very different from that of *Lanio*, being much shorter, broader, thicker, and more swollen, with the culmen much arched towards the tip. The single specimen contained in the collection is not in very good condition, but its perfect distinctness from every known species of Tanager is obvious at first sight.

124. **PYRANGA RUBRA** (L.) ♀.

125. **PYRANGA ÆSTIVA** (L.) ♀ et ♂ juv.?

126. **RAMPHOCELUS DIMIDIATUS** (Lafr.) ♀.

127. **EUCHÆTES COCCINEUS**, J. Verreaux, MS., sp. et gen. nov. (Pl. CXXXII. fig. 1.)

Coccineus, loris, facie et mento cum gutture et collo antico, alis caudaque nigerrimis: rostro et pedibus nigris.

Long. tota 6·5, alæ 3·5, caudæ 2·4, rostri a fronte 0·55, a rictu 0·7, tarsi 0·9.

The single specimen of this bird in the present collection is the most interesting novelty which I have met with since I commenced studying the group to which it belongs. Its plumage is precisely that of a *Ramphocelus*, but the structure is quite different, and renders it impossible to place it in that group. The form of the bill is rather that of the true *Tanagra*, and agrees more nearly with that of *Tanagra olivi-cyanea* and *Buthraupis eximia*, but it is shorter, thicker, and more swollen than in the former, though not so much so as in the latter of these birds. The tail is comparatively much shorter than in either of these forms; and altogether it is, I think, impracticable to arrange it in any other way than as a separate generic division, for which the following characters may suffice:—

* κρεουργός *lanius*, et ὠψ *facies*.

Rostrum forte, breve, carinatum, compressum, culmine arcuato, gonyde ascendente, dente finali distincta, commissura paululum sinuata; vibrissis nullis: alæ longæ, remige prima quartam æquante et a secunda et tertia longissimis paulo superatis: cauda brevis, apice modice rotundata: pedes fortes, sicut in genere Buthraupide: ptilosis coccinea, nigro varia.

128. TANAGRA MELANOPTERA, Hartl.
 129. CALLISTE PULCHRA (Tsch.).
 130. CALLISTE SCHRANKI (Spix).
 131. CALLISTE GYROLOIDES (Laf.).
 132. CALLISTE VENUSTA, Sclater.
 133. CHLOROCHRYSA CALLIPARÆA (Tsch.), juv.
 134. EUPHONIA XANTHOGASTRA, Sund.
 135. EUPHONIA RUFIVENTRIS (Vieill.) ♀.
 136. PROCNIAS OCCIDENTALIS, Sclater, P. Z. S. 1854, p. 249.
 137. CHLORONERPES SELYSI, Malh.
 138. CELEUS JUMANA (Spix), Av. Bras. i. p. 57. pl. 47.
 139. CELEUS GRAMMICUS, Malh. Mém. Soc. Roy. Liège, 1845, p. 69.
- I have a specimen of this bird from the Peruvian Amazon.
140. CELEUS VERREAUXI.
- Celeopicus verreauxi*, Malh. MS.*

* M. Malherbe, who examined and named the *Picidae* in this collection before they came under my inspection, has kindly transmitted to me the following notes on this new species, of which there was but one specimen:—

Celeopicus verreauxi, Malherbe.

" ♂ adultus—*Rostrum albido-corneo, basi livido; pileo toto, capite ad latera et occipitis crista obscure castaneis, in medio nigris; corpore supra flavido-cinnamomeo, abdomine remigibusque secundariis cinnamomeo-rufis, omnibus immaculatis; alarum tectricibus minoribus pectoreque medio cinnamomeo-rufis, faciolis nonnullis cordiformibus, interruptis, nigris variegatis: gula et colli plumis castaneis in medio nigris; remigibus primariis nigricantibus, intus basin versus flavido-rufescentibus, extus plus minusve rufis: hypochondriis alarumque tectricibus inferioribus rufescenti-flavis; plus minusve ad basin rufo marginatis: pedibus griseo-virescentibus.*

" Long. tota 220–230, alæ 133, caudæ 73–80, tarsi 19 mill. Gall.

" Ce grimpeur ressemble beaucoup au *C. grammicus*, mais on le distingue de prime abord parceque le *C. grammicus* a tout le dos, les scapulaires, toutes les tectrices alaires et les rémiges secondaires ainsi que les parties inférieures, à l'exception du bas-ventre, rayés transversalement de bandes noires: le croupion, qu'est d'un jaune mêlé du roussâtre, et les tectrices caudales, qui sont

141. *DRYOCOPUS HÆMATOGASTER*, Tsch. Faun. Per. pl. 25.

142. *DRYOCOPUS ALBIROSTRIS* (Spix), Av. Bras. i. pl. 45.

143. *PICUMNUS* — ? , ♀.

144. *CAPITO PERUVIANUS*, Cuv.

145. *EUBUCCO HARTLAUBI*, juv. ?

146. *PIAYA MEHLERI*, Bp. Consp. p. 110 ?

Agrees with specimens of the New Grenadian representative of *P. cayana*, which I suppose to be the bird intended by Prince Bonaparte for *P. mehleri*.

147. *RAMPHASTOS CULMINATUS*, Gould, Mon. ed. 2. pl. 11.

148. *PTEROGLOSSUS PLURICINCTUS*, Gould, Mon. ed. 2. pl. 17.

149. *PTEROGLOSSUS FLAVIROSTRIS*, Fraser ; Gould, Mon. ed. 2. pl. 29.

150. *ANDIGENA NIGRIROSTRIS** (Waterh.) ; Gould, Mon. ed. 2. pl. 44.

The specimens from the Rio Napo have an obsolete orange band at the base of the upper mandible, which extends rather more forward in front of the nostrils. Bogota specimens have the bill black.

151. *SELENIDERA REINWARDTI* (Wagl.) ; Gould, Mon. ed. 2. pl. 35. ♂ et ♀.

152. *AULACORHAMPHUS ALBIVITTATUS* (Boiss.) ; Gould, Mon. ed. 2. pl. 49.

153. *CHRYBOTIS AMAZONICA* (Gm.), Buff. Pl. Enl. 547.—*Psitt. amazonicus*, Wagl. Mon. Psitt. p. 588. sp. 7.

154. *CHRYBOTIS FARINOSA* (Bodd.), Buff. Pl. Enl. 861.—*Psitt. pulverulentus*, auct., et Wagl. Mon. Psitt. p. 582. sp. 4.

155. *CHRYBOTIS MERCENARIA* (Tsch.).—*Ps. mercenarius*, Tsch. Faun. Per. p. 270.

I refer this bird to Tschudi's species, because it agrees with his description. It does not agree with the figure given in the 'Fauna Peruana,' as that represents a red patch in the wing. But the plates of this work are so untrustworthy, that I think it is unad-

rousses, ne portent aucune bande noire, tandis que le *C. verreauxi* a toutes ces parties d'un roux marron clair uniforme et n'a que quelques taches noires sur les petites tectrices alaires.

"On ne confondra pas non plus cette espèce nouvelle avec le *C. castaneus* (Licht. nec Swainson) décrit par Wagler, Isis, 1829, p. 515, ou *badioides*, Less. (Cent. Zool. pl. 14. p. 56. 1830-31, et Trait. d'Orn. p. 226, 1831), dont elle a aussi la taille et les caractères."

* Since separated specifically by Mr. Gould under the title *Andigena spilorkhynchus*, P. Z. S. March 23rd.

visible to pay too much attention to them, particularly as I have already been led into error by following them as a guide instead of the letter-press. This bird may be recognized among its congeners by the yellow bend of the wing, by the *want* of the red wing-mark, and by the blue patch on the outer web of the exterior pair of tail-feathers, the inner web, and both webs of the second, third, fourth and fifth pair having a large red spot, and the middle pair being wholly green. The same bird is in the British Museum from New Grenada (Bogota).

156. CAICA BARRABANDI (Kuhl), Le Vaill. Perr. pl. 134.

157. CAICA MELANOCEPHALA (Gm.), Pl. Enl. 527.

158. ARA MILITARIS (Linn.).—*Sittace militaris*, Wagl. Mon. Psitt. p. 668. sp. 35; Edwards' Birds, pl. 313.

159. CONURUS GUIANENSIS (Gm.) ?

160. CONURUS WEDDELLI, Deville, Rev. et Mag. de Zool. 1851, p. 209.—*Maracana weddellii*, DesMurs, Voy. de Casteln. Ois. pl. 2. p. 13.

161. CONURUS JUGULARIS, Deville, Rev. et Mag. de Zool. 1851, p. 209; DesMurs, Voy. de Casteln. Ois. pl. 3. fig. 2. p. 15.

162. CONURUS — ?

A new species, which M. Jules Verreaux has undertaken to describe.

163. LEPTOPTILA DUBUSI, Bp. Consp. ii. p. 75.

164. CHLORGNAS SPECIOSA (Gm.), Pl. Enl. 213; Bp. Consp. ii. p. 54.

165. PENELOPE PIPILE (Gm.).

166. PENELOPE — ?

167. ORTALIDA MONTAGNII, Bp. Compt. Rend. xlii. p. 875 (May 12th, 1856).

168. ORTALIDA GUTTATA (Spix).—*Penelope guttata*, Spix, Av. Bras. ii. p. 55. pl. 73.

169. ABURRIA CARUNCULATA (Temm.), Bp. Gall. Consp. Syst. in Compt. Rend. (May 12th, 1856).

170. TINAMUS JULIUS, Bp.

171. PSOPHIA — ? (affinis *P. crepitanti*).

An example of this peculiar S. American genus is in the collection, which M. Jules Verreaux considers referable to a new species. Such is very probably the case, unless it be the same as one of the two new *Psophiæ*, lately described by Pelzeln in the 'Sitzungsberichte' of the

Imperial Academy of Sciences of Vienna. But I have not access to specimens for comparison, so as to enable me to satisfy myself on this point, and I therefore prefer leaving it to M. Jules Verreaux, who is better acquainted with these birds than I am, to make further researches on this, the result of which I hope to induce him to communicate to this Society.

172. *NYCTICORAX GARDENI* (Gm.), Bp. Cons. ii. p. 141.

173. *HARPIPRION CAYENNENSIS* (Gm.), Bp. Cons. ii. p. 155.

174. *RYNCHOPS NIGRA*, Linn.

February 9, 1858.

Dr. Gray, F.R.S., V.P., in the Chair.

Mr. Gould exhibited to the Meeting British specimens of the *Motacilla flava* of Ray, which had been shot by Mr. Thirtle of Lowestoft, to whom Mr. Gould was indebted for the following note as to its occurrence in that part of England:—

“In February 1855, at Lowestoft there were to be seen on a large extent of waste grass land called the Denes, from 70 to 80 Yellow Wagtails, which is a very uncommon occurrence, for we seldom have more than two or three pairs during the whole summer, and last summer (viz. 1857) I did not see one, although I looked for them several times.

“The birds named as above in 1855 were to be seen from about the 12th of February until the latter end of March. On the 14th of February I observed amongst them a Grey-headed Wagtail, and immediately went home for my gun, and I shot it and preserved the same: the head was only partially grey. The next day I killed a better specimen; and within a fortnight from killing the first, I obtained seven specimens in all, they being all male birds. I have no doubt that there were females with them, but I could not make them out from the Yellow Wagtails.

“The last killed were in the best plumage.

“During the time these birds were on the Denes the wind was blowing from the north-east, with bright sunny days; and the wind had been blowing from the same quarter from about Sept. 20th, 1854, and continued to do so until April 13th, 1855, not having any other direction for twenty-four hours during the whole time.

“I know only of two instances of the Grey-headed Wagtail being

killed in this locality—one male in the last week of May 1851, and a male in May 1852: this was with a female.

“JAMES THIRTLE,
“*Bird Preserver, &c., Lowestoft.*”

Mr. Gould also called the attention of the Meeting to three beautiful specimens of Steller's Duck, which had been brought for exhibition by Mr. Stevens. Mr. Gould remarked, that although this species was a native of high northern regions, even to within the Arctic circle, it had been more than once killed in England. The bird certainly belongs to the family of the true diving ducks, of which the King and the Eider may be considered typical examples, and with these it has usually been associated by ornithologists; but the female differs remarkably from the females of those species in possessing a well-marked speculum on the wing, and the bill on examination will be found to differ in form, approaching nearly to that of the Smew (genus *Mergellus*), or perhaps still more nearly to that of *Merganetta*; but it is not precisely like that organ in either of those genera, and Mr. Gould therefore considered that Mr. G. R. Gray had very properly made it the type of a new genus, *Eniconetta*.

The following papers were read:—

1. ON THE CHARACTERS OF FOUR SPECIES OF BATS INHABITING EUROPE AND ASIA, AND THE DESCRIPTION OF A NEW SPECIES OF *VESPERTILIO* INHABITING MADAGASCAR. BY ROBERT F. TOMES.

(Mammalia, Pl. LX.)

One of the most beautiful of the Bat kind is the *Vespertilio pictus* of Pallas. Like many of its congeners, it has been abundantly supplied with titles. One of these is *Vesp. Kerivoula*, given to it by Boddaert.

Dr. Gray having perceived that it possessed some peculiarities which entitled it to further consideration, and to still further distinction, proposed to elevate it to the rank of a distinct genus, and employed the rejected name given to it by Boddaert by which to designate the new genus.

In the 'Annals and Magazine of Natural History,' vol. x., Dr. Gray made it the type of his genus *Kerivoula*, and associated with it several other species which he considered as representatives also of the new genus. Without going at length into the details of the examination which have led me to make use of the generic name above noticed, I may mention, that throughout the present communication, whenever I have occasion to speak of the species, it will be under the name of *Kerivoula picta*. But whilst I adopt this name for the species, I reject most of the associates provided for it.

The great beauty of the *Kerivoula picta* consists in its bright rust-coloured fur, and in its pied orange-and-black membranes. But



there is another species which in respect of colour greatly resembles it, indeed far surpasses it. It is a native of China, and the specimen from which the illustration accompanying the present paper was taken, was presented to the British Museum by Mr. Fortune, its precise locality being Shanghai.

At the time the illustration was executed, I supposed, from the extraordinary richness of its colour, that it could not be a known or described species, and I had proposed to give it the name of *Vesp. rufo-niger*. A careful examination, however, of specimens of *Vesp. formosa* in the British and East India Company's Museums has shown me that it differs from that species chiefly in the intensity of the colour of the fur and membranes.

The examination of these examples led further to the inspection of the *Vesp. rufo-pictus* of Waterhouse, and again to some other species possessed of similar forms, but not gifted with the beauty of colour observed in those mentioned above.

It will be the purpose of this communication to point out these species, and to endeavour to show that none are referable to the genus *Kerivoula* (supposing it to be typified by the *Kerivoula picta*), in which some of them have been placed by Dr. Gray.

In general form the examples of this group—scarcely of sub-generic importance—bear some resemblance to the common *Vesp. murinus* of Europe. They all have a somewhat thick though not broad muzzle, and a crown but slightly raised above the level of the face; nostrils which are removed from each other by only a moderate interval, and that interval not emarginate in the specimens preserved in spirit, although very slightly so in those which are dried. The ears are in all the species more or less ovoid, and deeply and evenly hollowed or scooped out about the middle of the outer margin, as in the *Vesp. emarginatus* of Europe. The tragus is rather long, nearly straight, and diminishes evenly to an acute point. The membranes of the wings extend to the base of the toes, and the latter are much longer than the remaining part of the foot; and as if for the sake of uniformity, the terminal phalange of the thumb is much longer than the basal one*.

The fur is everywhere thick and *cottony*, and is either bicoloured or tricoloured, with a tendency to spread on to the upper surface of the interfemoral membrane.

At present I have not had the opportunity of examining the cra-

* The great length of the toes in relation to the length of the foot depends very much on the elongation of the phalange next to the one bearing the claw; and it is the corresponding phalange of the thumb that is so much the longest. It would appear worthy of inquiry whether the corresponding phalanges of the fingers are relatively longer. This I do not find to be absolutely the case, although in *Miniopterus* reversed proportions of the comparative length of the toes with the remaining part of the foot take place, accompanied by corresponding reversed proportions in the length of the phalanges of the fingers. Thus the toes are short, and the phalanges of the fingers which answer to them, equally short; in the present group the toes are long, and the joint of the thumb which corresponds, elongated in accordance with them; but the wing-joints exhibit no such relative proportions.

nium of either of the species, but am able to observe in the specimens in spirit and in those in skin, that the front teeth are of considerable substance in relation to their length, and that the upper incisors are placed in pairs, the pairs being separated from the canines by a considerable interval on each side, and from each other by a central interspace.

From the *Kerivoula picta*, and a few more allied species, this group differs remarkably in not having the top of the head elevated, in having the muzzle much thicker relatively, in the greatly inferior development of the ear-couch, and in several other minor details. However, it agrees with *Kerivoula* in the form of the tragus, and in some measure in the texture of the fur.

1. *VESPERTILIO EMARGINATUS*, Geoff.

V. emarginatus, Geoff. Ann. du Mus. t. viii. p. 199. pl. 46 & 48, 1806; Desm. Mam. p. 140, 1820; Millet, Faun. de Maine et Loire, t. i. p. 10, 1828; Fisch. Synop. Mam. p. 105, 1829; Bonap. Fauna Italica, i. 1832-42; Temm. Mon. ii. p. 190. pl. 51, 1835-41; Hollandre, Faune de la Moselle, p. 6, 1836; De Selys-Longch. Etud. Micromamm. p. 139, 1839; Faune Belge, pp. 1, 20 & 300. pl. 2. f. 4, 1842; Schinz, Europ. Fauna, i. p. 15, 1840; Synop. Mamm. i. p. 154, 1844.

Although the present well-marked species is cancelled from the European list by MM. Keyserling and Blasius, it is certainly a perfectly distinct and easily recognizable species, and not uncommon in several localities on the continent of Europe; but does not I believe occur in the British Islands. I have seen and examined specimens in the Museums of Leyden and Paris; in the latter, the type specimens from Charlemont and Abbeville, together with others collected by M. de Selys-Longchamps in Belgium; but I sought in vain for the specimen which M. Brongniart obtained near Dover. I believe that it was merely an old female of *V. mystacinus*, and perhaps from its cranium the illustration was taken which accompanies the description given by M. Geoffroy. At any rate that figure represents with tolerable accuracy the cranium of *V. mystacinus*, and is obviously too small for the *V. emarginatus*, as well as being too much inflated. I arrived at this conclusion, having before me the plate and the type specimens.

I cannot learn that this species has been met with, excepting on the continent of Europe. Whilst many other European species occur not only over the whole of Europe, but also in Madeira, the Mediterranean shores of Africa, and even as far in Africa as Lake Ngami, the present one appears to be confined to France, Belgium, Holland, and the environs of Rome.

The following description has been taken from the specimens in the Paris Museum:—

Muzzle rather long, thick in a vertical direction, but not broad; top of the head very slightly elevated; nostrils small, near together; ears of medium size, ovoid, with a distinct and regular notch near

the middle of their outer margins; tragus narrow and tapering to an acute point, which is directed outwards; its outer margin has a notch near the base.

Wing-membranes extending to the base of the toes; the latter longer than the remaining part of the foot; thumb with the free portion much longer than that which is engaged in the membrane.

The fur of the forehead, which is very thick, extends uninterruptedly to halfway between the end of the nose and the eyes; all the side of the face from the root of the ear to the snout is naked, with the exception of a tuft of stiff hairs in front of the eye and a moustache on the upper lip. The ears are a little hairy at the base of their hinder surface, and the fur of the back encroaches a little on the interfemoral membrane.

Everywhere the fur is very thick, soft, and *cottony*, with very little gloss. That of the upper parts is tricoloured, and that of the under surface bicoloured.

On the top of the head and the whole of the back it is blackish brown at the base for a fourth of its length, succeeded by yellowish buff, and tipped with light rust-colour, the latter prevailing most on the shoulders and on the interfemoral membrane. All the under parts have the fur dusky at the base for half its length, the remainder being pale buff, and it is so thick and close as to appear wholly of the latter colour unless it be moved.

Individuals vary considerably in the hue of the rust-coloured and buff portions of the fur, so that their general appearance may be either light reddish buff-colour, or a medium brown; but in either case the bicoloured and tricoloured character of the fur is maintained.

The specimen of *V. emarginatus*, which formed part of the Italian collection of the late Prince C. L. Bonaparte, having been presented by him to me during a stay in Paris in the spring of 1857, I am enabled to correct an error into which I had fallen, with some other zoologists, in regarding it as referable to *V. Nattereri*. It is unquestionably the *V. emarginatus* of Geoffroy. This specimen, preserved as a skeleton, but a good deal injured, supplies the following details respecting the dentition* :—

In. $\frac{2-2}{6}$; Can. $\frac{1-1}{1-1}$; P. M. $\frac{1-1}{3-3}$; M. $\frac{3-3}{3-3} = \frac{14}{30}$.

* It may not be amiss to record here the exact condition of the specimens of Chiroptera presented by Prince Bonaparte, because they are the types of his descriptions in the 'Fauna Italica.' The species which I received were as follow :—*Vesp. emarginatus*, *V. Aristippe*, *V. vespistrellus*, *V. Cappacini*, *V. miniopterus*, *V. Ursinii*, *Noctula leucippe*, *Pipistrellus Savii*?, *P. noctula*, *P. alcythoe*, *Plecotus auritus*, and *Rhinolophus ferrum-equinum*, the names here given being those attached to the specimens. It appears that they had been prepared as skeletons, with the membranes and ears left attached, and had then been expanded on pieces of card-board and varnished, the skin and fur having been also attached to the card. In this state they had been placed in a portfolio prepared for their reception, which previously to passing into my hands had been subjected to sufficient pressure to crush and very much injure the specimens, the crushed parts being in some of them lost.

The dental series of the upper jaw when seen from below presents two straight and nearly parallel lines, the space between them being closed across the front opening by the transverse position of the incisors. They are so placed as to occupy nearly all the opening. Seen laterally they are nearly vertical; but when viewed in front, they slope so much inwards that the points of the inner ones nearly touch each other, and thus fill up nearly the whole of the interval between the two canines. The space between them and the canines is very small. The inner ones are rather large and deeply forked; the outer ones smaller and conical. The canines are short and stout, angular, and somewhat pointed. All the remaining teeth in the upper jaw are of the form common to nearly all the species of *Vespertilionidae*.

The lower incisors are small, close together, and trilobed; the canines short and rather stout; and the three following teeth conical and increasing in size, the one next to the true molars being considerably larger than the two others, which are nearly equal. The molars present nothing remarkable in their form.

The following dimensions have been taken from three specimens in the Paris collection,—one from Charlemont, one from Abbeville, where it was collected by M. Baillon, and the third from a specimen obtained by M. Hollandre at Metz.

	1.	2.	3.
Length of the head and body ..	2 10"	2 9"	2 8"
— of the tail	1 3	1 3½	1 2½
— of the head	0 9	0 8½	0 9
— of the ears	0 6	0 6½	0 6½
— of the tragus	0 3½	0 3½	0 4
— of the fore-arm	1 5½	1 5½	1 5
— of the longest finger ..	2 6	2 7	2 6
— of the fourth finger...	2 0	2 0	2 1
— of the thumb	0 3½	0 3½	0 3½
— of the foot and claws ..	0 4	0 4	0 4
Expanse of wings	10 6	10 0	9 10

2. *VESPERTILIO FORMOSUS*, Hodgs.

V. formosus, Hodgs. Journ. As. Soc. Bengal, iv. p. 700, 1835.

Kerivoula formosa, Gray, Cat. Mam. Brit. Mus. p. 27, 1843; Cat. Mam. and Birds of Nepaul, presented by B. H. Hodgson, in Brit. Mus. p. 4, 1846.

Vesp. (Kerivoula) formosa, Horsf. Cat. Mam. Mus. E. Ind. Comp. p. 40, 1851.

V. rufo-niger?, Tomes, MSS.

Mr. Hodgson thus describes this species:—"Entirely of a bright, soft, ruddy yellow, with the digital membranes triangularly indented, blackish. Head conical; face sharp; muzzle and lips confluent nudish; the former anteally grooved, not above; the outer and

inner ears acutely pointed, moderate, less than the head; teeth $\frac{2-3}{6}$, $\frac{1-1}{1-1}$, $\frac{6-8}{6-8}$; snout to rump $2\frac{1}{2}$ inches; tail 2; expanse $12\frac{1}{2}$.

"Nasal bones slightly convexed in their length, and unite easily with a low forehead."

The following is the description of the specimen deposited in the British Museum by Mr. Hodgson. The specimen is preserved in spirit; but the skull having been removed, renders the description less perfect than might have been wished:—

Nostrils rather small and approximate. Feet rather large, the toes taking up fully two-thirds of their entire length. Wing-membranes extending barely to the base of the toes. Thumb with the basal phalange short, the one between it and the small one bearing the claw, taking up the greater part of its length. Tail-tip wholly enclosed in the interfemoral membrane.

Membranes (when wet with spirit) translucent, and marked with reddish brown and dark brown, the latter occupying the triangular spaces between the digits, and the former appearing as narrow stripes on each side of all the bones of the wings—just as in *Kerivoula picta*.

Fur very thick, that of the under parts yellowish buff, that of the upper similar at the root and tipped with rust-colour.

The specimen included in Dr. Horsfield's 'Catalogue of the Mammalia contained in the Museum of the East India Company' affords the following particulars:—Muzzle rather produced, thick, but not broad; top of the head scarcely elevated above the line of the face; nostrils small, near together, opening sublaterally, and slightly tubular. Ears ovoid, emarginate at their outer margin; tragus long, slender, and tapering evenly to a moderately acute point, which is curved a little outwards. Wing-membranes extending to the base of the toes, barely; the feet large, the toes occupying fully two-thirds of their entire length. The basal joint of the thumb very short in relation to the length of the second.

Fur very thick and close, and *cottony* in texture; that of the upper parts yellow-buff, with the tips of the hairs conspicuously tipped with rust-colour; below, uniform yellow-buff.

The interfemoral membrane, the portions of membrane contiguous to the flanks, and all the parts in the immediate vicinity of the bones of the wings and legs, chestnut-coloured, all the remaining parts of the membrane being black-brown.

The following description has been taken from the specimen from which the illustration (Pl. LX.) accompanying the present paper has been drawn, and, as already stated, from Shanghai; and I may observe that a specimen in my own collection, also from China (Kiang), is similar, but with the colours even brighter than those of the plate. As these examples differ from those already described in a few particulars only, save in colour, it will be necessary to mention merely these points of difference, and the remarkable colouring of the fur of this variety—if it is not a distinct species:—

Ears ovoid, nearly the length of the head, and more deeply and evenly notched near the middle of the outer margin than in the

ordinary examples of *V. formosus*; tragus very narrow and tapering to a very acute point, curved a little outwards. The extreme tip of the tail free.

On all parts of the body the fur is thick and *cottony*, with very little gloss. That of the upper parts tricoloured, excepting on the head, where it is bicoloured. On the latter part it is buff at the base, tipped with very bright rufous; on the whole of the back it is blackish grey at the base, succeeded by buffy yellow, and finally tipped with bright rufous. The rufous colour is brightest on the head and shoulders, from which parts it becomes darker and less pure on approaching the rump. The hair which extends on to the base of the interfemoral membrane is unicoloured, and dark red-brown. On the whole of the under parts, the fur is bicoloured; that of the throat resembles that on the top of the head, being buffy yellow, tipped for about a fourth of its length with bright red. Along each side of the body, from the insertion of the humerus to the pubal region, it is similar to the throat; but the rufous colour occupies more than half the length of the fur. Along the middle of the belly it is dusky at the base, similarly tipped with a deep and brilliant rufous colour.

The membranes are very conspicuously marked with two colours, brown-red and black. The latter colour may be called the real colour of the wings; but a narrow space on each side of all the bones is of the former; of this brown-red colour also is the whole of the interfemoral membrane and the membrane between the index finger and the longest. Beneath the fore-arm, and from thence by the side of the body to the hinder limb, the red colour is of considerable breadth, attaining to as much as three-quarters of an inch. From this space it runs in dotted lines into the black colour of the wing, and produces great richness of appearance. The ears are red-brown, tipped and margined exteriorly with black. The feet also are black; but the legs and all the bones of the wing are of the same red colour as the contiguous membrane.

In the annexed table of dimensions, column No. 1 represents Mr. Hodgson's specimen in the British Museum, No. 2 the specimen in the East India Company's Museum, No. 3 the Shanghai specimen, and No. 4 the one from Kiang.

	No. 1.	No. 2.	No. 3.	No. 4.
Length of the head and body..	" " "	2 10	2 4	2 9
— of the tail	2 0	1 6	1 8	1 9
— of the head .....	....	0 9	0 7½	0 8½
— of the ears .....	....	0 6	0 7	0 6
— of the tragus .....	....	0 3½	....	0 3½
— of the fore-arm	1 10	1 10	1 9½	1 10
— of the longest finger ..	3 2	3 0	3 0	3 2
— of the fourth finger ..	2 6	2 8	2 6	2 7
— of the thumb	0 4½	0 5	0 5	0 5
— of the tibia .....	....	....	0 10½	0 11
— of the foot and claws..	0 5½	0 6	0 5	0 5½
Expanse of wings	12 7	12 0	13 6	12 6

Although I have treated the Chinese specimens as varieties of the Indian species, I hold it by no means proved that my first impression was not the correct one. The differences may be thus summarily stated:—1. The ears of the Chinese examples are more deeply hollowed out exteriorly. 2. The tragus is more acute. 3. The tip of the tail is free. In the Indian specimens the ears are less strongly emarginate, the tragus is sub-acute at the tip, and the tail wholly enclosed in the membrane; at least it is so in the specimen in spirit. The great difference in colour may perhaps be due to the influence of climate.

Without a greater number of examples for examination, and especially without an investigation of their crania and dentition, it is difficult to decide with certainty whether this is merely a remarkable variety, or a distinct species. Should it however prove to be distinct, I propose for it the name I at first made use of to designate it, viz. *Vesp. rufo-niger*.

3. VESPERTILIO RUFO-PICTUS, Waterh.

Vesp. rufo-pictus, Waterh. P. Z. S. pt. 13. p. 8, 1845.

Kerivoula rufo-picta, Gray, Zool. Voy. Samar. no. 5, 1849.

The original specimen from which Mr. Waterhouse took his description having passed into my hands at the dispersion of the Museum of the Zoological Society, I have been enabled to examine it attentively, and to compare it with Mr. Hodgson's specimen of *V. formosus* in the British Museum, from which it at first sight appears to differ only in being a little larger. On more careful examination it proves to be quite an immature individual, so that if full-grown it would probably differ considerably in size from that species. Again, the number of the teeth appears to be different—different at least from the account given by Mr. Hodgson of the dentition of *V. formosus*. He says, "Teeth $\frac{2-2}{6}$, $\frac{1-1}{1-1}$, $\frac{6-6}{6-6}$," I can only detect $\frac{5-5}{5-5}$ molars in the specimen of *V. rufo-pictus*, of which two on each side, above and below, are false molars.

The face is rather long and somewhat obtuse, but not much broader laterally than it is thick in a vertical direction; the top of the head very little elevated; the nostrils small and near together, with the space between them slightly depressed rather than emarginate. The glands of the upper lip do not approach very closely to the edge of the latter, but pass backwards over the eyes almost to the front margins of the ears, and leave a central longitudinal depression along the face, up the middle of which is a narrow raised ridge, producing, to use the words of Mr. Waterhouse, "two longitudinal grooves." The ears are very similarly shaped to those of *V. formosus*, but I think a little less emarginate. The tragus has a distinct tooth or lobe at its outer margin, close to the base, above which is a considerable indentation, succeeded by an obtuse angle, from which it passes in a straight line to the tip, which is tolerably acute. The inner margin is nearly straight. Both the ears and tragus, when examined by transmitted light, appear to be glandular in structure.

The feet are large; the toes occupying fully two-thirds of their entire length. The *os calcis* takes up two-thirds of the distance between the foot and the end of the tail; the latter wholly enclosed in the interfemoral membrane. The middle phalange of the thumb (as in all others of the group) long, the basal one short.

The fur on the top of the head is thick, but does not extend so near to the end of the nose as in *V. formosus*. On the space around the eyes are some irregular tufts of longish hairs, and the upper lips are furnished with moustaches of bristle-like hairs; and all the upper surface of the snout, from above the nostrils to the fur of the forehead, is similarly studded with short bristly hairs.

The fur on the back extends on to the base of the interfemoral membrane for a fourth of its length, and along the tibiae to the upper surface of the feet, the outer toe * being furnished with short bristly hairs on the whole of its upper surface, and the others hairy only on their terminal and subterminal phalanges. The interfemoral membrane has a series of similar short hairs on the whole of its hinder margin.

On all the upper parts the fur is close, firm in texture, and bicoloured; light dusky grey at the base, with the tips yellowish buff. Below, it appears to be unicoloured, buffy ash, with a strong tinge of yellow about the axilla.

It is probable that the fur would be more markedly bicoloured in older examples, as we see in other species that the colours of young specimens are much less distinct than in older ones.

The membranes are marked precisely as in *V. formosus*, and require no further notice.

Dentition.—In. $\frac{2-2}{6}$, Can. $\frac{1-1}{1-1}$, Premol. $\frac{2-2}{2-2}$, Mol. $\frac{3-3}{3-3} = \frac{16}{18}$.

Dimensions :—

Length of the head and body	2	6"
—— of the tail	2	1
—— of the head	0	10
—— of the ears	0	6
Breadth of ears	0	5
Length of the tragus	0,	3 $\frac{3}{4}$
—— of the fore-arm	1	11 $\frac{1}{2}$
—— of the longest finger	3	2
—— of the fourth finger	2	9
—— of the thumb	0	5
—— of the tibia	1	0
—— of the foot and claws	0	6
—— of the <i>os calcis</i>	0	11 $\frac{1}{2}$
Expanse of wings	13	2

* The so-called outer toe of a bat, with the members extended, corresponds with the inner toe of other mammalia.

4. *VESPERTILIO PEARSONII*, Horsf.

Laniurus Pearsonii, Horsf. Cat. Mam. Mus. E. Ind. Comp. p. 36, 1851; Blyth, Journ. As. Soc. Bengal, no. 6. 1851, p. 524.

This is much the largest species of the group, and probably if sufficiently examined would prove to be also the most characteristic. But at present I have only had the opportunity of examining three specimens, all in the state of skin; viz. the type of Dr. Horsfield's description, another in the same collection from Nepal, presented by Mr. Hodgson, and the third in the British Museum, from Amboyna. From these examples the following description has been taken, which will be followed by remarks on their individual differences.

The top of the head is rather flat, scarcely so much elevated as in *V. murinus*; the muzzle is also rather broad and obtuse, as in that species, and the nostrils have nearly the same form and proportions. The ears are as broad as they are high, very much rounded at the end, and with a distinct and evenly-defined notch, *scooped* in their external margin. They resemble the same parts in *V. emarginatus*, but are much broader in relation to their length, and less deeply hollowed out externally. As in that species they are thickly dotted with fine glandular spots. The tragus is narrow, and tapers to an acute point, with a slight outward curvature, and it is furnished with a projecting angular point at its outer edge near the base. It is rather more than half the length of the ear.

The wing-membranes extend to the base of the toes, and the latter are fully two-thirds of the entire length of the foot. The claws are strong and hooked. The thumb is very long, and its claw also large and hooked, more so relatively than in any of its congeners. The tip of the tail is free from the membrane.

The upper canines are very short, stout, and conical, with a blunt inner lobe; the lower ones are also stout and short, as are also the incisors, above and below.

The upper surface of the interfemoral membrane is more or less covered with hair, varying somewhat in different individuals, and the portions of the wing-membranes contiguous to the sides of the back are also hairy. Beneath, the membranes are hairy only in close proximity to the vent and lower part of the body.

In texture the fur is soft, thick, and *cottony*, and rather long, that on the middle of the back being as much as 5 lines in length.

On the upper parts the fur is tricoloured, as in the other members of the group. That of the back has the base dusky, succeeded by yellowish grey for the greater part of its length, and the remainder rufous brown, with the exception of the extreme tips of the hairs, which in the type specimens are paler and shining; the general colour of the fur of the upper parts, when undisturbed, being a dull rufous brown, excepting that on the interfemoral membrane, which is of a somewhat brighter rufous tint, and uniform in colour for its whole length.

The general tint of the under parts is palish brown, each hair being reddish brown for the greater part of its length, with shining

tips of the same colour, but paler. The shining tips are most observable on the breast, and least so on the pubes.

Mr. Hodgson's specimen differs only from the type specimen in the absence of the shining tips to the fur. In both of these the membranes are reddish brown, with *the portions contiguous to the bones of the wings somewhat diaphanous, and corresponding pretty accurately with the red parts in V. formosus.*

The specimen from Amboyna differs so considerably in colour, that it will be well to give a description of it separately.

The interfemoral membrane has about twenty-four strongly marked transverse dotted lines; and about ten or twelve similar ones may be seen on the base of the wings, parallel to the body.

On the whole of its upper surface the interfemoral membrane is clothed with hairs, but not very thickly, excepting on the *os calcis*, which is thickly fringed, as are also the feet; also the membrane contiguous to the back is similarly furnished with hair. The under surface of the membranes contiguous to the body, i. e. from the axilla, by the flanks and around the pubes, is also clothed with hairs, which thin off gradually, and are lost at the distance of a little more than half an inch from the body.

The whole of the fur is of the same peculiar texture observed in the other examples, fine, and of medium length. On all the under parts of the body it is purple-brown at the base, for a third of its length, succeeded by purplish white, and tipped with bright rust-colour. That which extends on to the upper surface of the membranes is of a uniform rust-colour, and the face is wholly rust-coloured. Beneath, all the fur is of a brownish-white colour, tinged with rufous on the shoulders.

The membranes are dark reddish brown, the interfemoral, and those parts which are red in *V. formosus*, being of a lighter and redder tint, but not so well marked as in that species.

The following are the dimensions of these examples; 1. the type specimen of Dr. Horsfield, 2. Mr. Hodgson's specimen, and 3. the one from Amboyna:—

	1.		2.		3.	
	3	1	2	6	1	6
Length of the head and body ..	1	8	0	7?	1	4½
— of the tail	0	11	0	10?	0	6½
— of the ears	0	6	0	5½	0	5½
Breadth of the ears	0	6	0	5½	0	3½
Length of the tragus	0	4	0	3½	0	3
— of the fore-arm	1	10	1	8	1	5
— of the longest finger ..	2	8	3	4	2	2½
— of the fourth finger....	2	8	2	7	1	10
— of the tibia	0	11	0	9	0	7
— of the thumb	0	7	0	6		
— of the foot and claws ..	0	5	0	5	0	4½
— of the <i>os calcis</i>	0	9	0	8		
Expanse of wings.....	13	7	13	4	9	3

The Plate represents the Chinese species collected by Mr. Fortune, already alluded to.

VESPERTILIO MADAGASCARIENSIS, n. s.

The species which I have thus named, although not appertaining to the restricted group which forms the subject of the present paper, is nevertheless a true *Vespertilio*. It is properly a member of the restricted group which is represented by *V. mystacinus*, *V. polythris*, *V. Chiloensis*, *V. ruber*, *V. Isidori*, *V. Hilairii*, *V. parvulus*, *V. trilatitius* (Temm. not Horsf.), and some others. As the first of these is the best-known species, I shall take it as a standard for comparison, and at the same time refer to any points of greater resemblance which the new species may have to others less known.

It is of about the same size as *V. Daubentonii*, but differs from it in other respects considerably. The top of the head is somewhat elevated, as in *V. mystacinus*, and, as in that species, the muzzle is rather short and pointed. The nostrils are small, near together, sublateral in their direction, and the space between them emarginate. The ears are of medium length, rather broadly ovoid, and deeply emarginate about the middle of the outer margin; but the notch has not the appearance of being *scooped* out, as in the species previously described in the present paper. It is in fact just as in *V. mystacinus*, but deeper. The tragus is about half the length of the ear, narrow and pointed, and curving slightly outwards. It has a prominent angle on its outer margin near to the base.

The thumb is small, and the two visible phalanges are of nearly equal length. The wings are proportioned much as in *V. mystacinus*. The feet are relatively rather large as compared with those of that species, but much less so than in *V. Daubentonii*, and the wing-membranes extend nearly *to the base of the toes*, the latter being of nearly equal length. The extreme tip of the tail is free.

The face is densely hairy, only the end of the nose and a small space between the eyes and ears being naked. On the upper lip are moustaches of long hair, and there are a few similar long hairs projecting from the chin. The ears are somewhat hairy on their outer surfaces, at the base only. All the membranes are naked.

The fur is thick and soft, with very little lustre, in texture very like that of *V. Chiloensis*. That of the upper parts is nearly unicoloured, of a deepish ferruginous hue, a little darker at the root than at the tip. Below, it is bicoloured, dark brown at the base, tipped with greyish brown, paler and unicoloured on the pubes.

The dentition has not been examined.

Length of the head and body, about	2	10
— of the tail	1	5½
— of the head	0	7¾
— of the ears.	0	5
— of the tragus.	0	3
— of the fore-arm.	1	5

Length of the longest finger	2	$\frac{11}{7}$
—— of the fourth finger	1	10
—— of the thumb	0	3
—— of the tibia	0	$7\frac{3}{4}$
—— of the foot and claws	0	$4\frac{1}{4}$
Expanse of wings	10	2

2. ON A NEW GENUS OF MYTILIDÆ, AND ON SOME DISTORTED FORMS WHICH OCCUR AMONG BIVALVE SHELLS. BY DR. J. E. GRAY, F.R.S., V.P.Z.S., PRESIDENT OF THE ENTOMOLOGICAL SOCIETY.

(Mollusca, Pl. XLI.)

We have for several years had some specimens of large *Mytilidæ* in the Museum Collection which I have always regarded as the types of a distinct genus, but have deferred from time to time their publication, as I was informed that Dr. Dunker and others were engaged on a monograph of the family. Dr. Dunker having published the species without forming it into a group, I have therefore brought it before the Society, and at the same time make some observations on a peculiarity which the species presents.

STAVELIA, n. g.

Shell inequivalve, inequilateral, subtrigonal; umbo anterior; the front of the ventral edge sinuous, the flatter valve with a broad expanded lobe on the front of the ventral margin, the more convex one with a deep sinuosity to fit the lobe of the other valve. Anterior adductor scar distinct, oblong; posterior roundish; submarginal scar parallel to the edge of the shell, entire. Hinge toothless. Ligament and cartilage linear, marginal, rather short.

Periostraca laminate, with elongated flat linear or tapering processes.

This genus differs from *Mytilus* in the inequality of the valve and the sinuosity of the lower edge, in the entire absence of any small teeth under the umbo, and in the paleaceous periostraca.

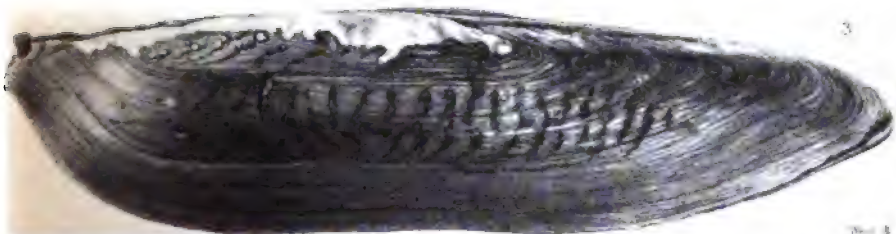
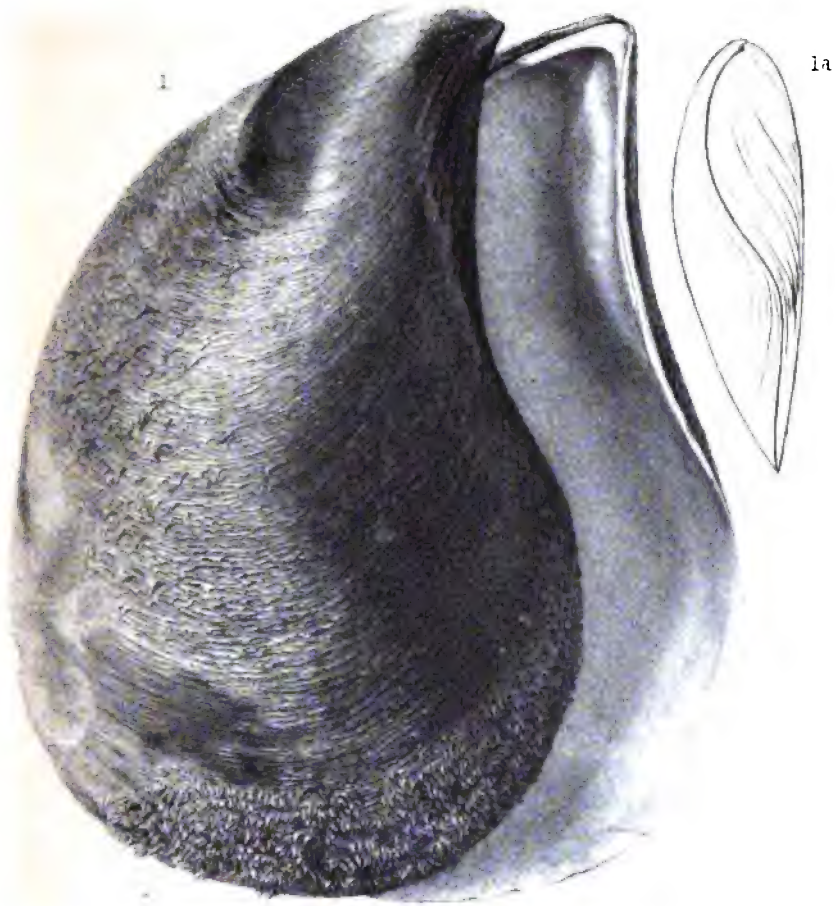
1. STAVELIA TORTA. (Pl. XLI. fig. 1.)

Mytilus tortus et *M. horridus*, Dunker, Proc. Zool. Soc. 1856; Reeve, Conch. Icon. t. 3. f. 6 & 9.

Hab. North Australia and Philippines.

I cannot discover any permanent character between the two specimens described by Dr. Dunker.

The specimens of this genus in the Museum, and others which have come under my observation, offer a peculiarity which I have hitherto only observed in a very few other bivalve shells, and in none to the extent which is presented in this species.



1. 1a *Stavelia torta*, Gray. 2 3 *Hyna lanceolata*



In my paper "On the Formation and Structure of Shells," in the 'Philosophical Transactions' for 1833 (reprinted by Dr. Johnston, 'Letter on Conchology,' p. 413), I observe,—

"In some very rare instances the shells (bivalves) are also reversed; but the fact is not easily observed except in the unequal-valved kinds. There were formerly in the Tankerville collection two specimens of *Lucina Childreni*, in one of which the right valve was a dextral shell, in opposition to the general structure. These specimens are now in the British Museum Collection."

The four specimens of this shell which I have under my eye present the same anomaly as the two specimens of *Lucina Childreni* above referred to, that is to say, two of them have the left valve the flattest and furnished with the large lobe on the front of the ventral margin, and in the other two it is the right valve which has this form and development; and I cannot observe any other peculiarity between the specimens than this indifference between the development of the sides of the animal. So that, as a *Lucina Childreni*, it is impossible to determine which is the normal form of the species. A somewhat similar indifference as to the direction of the shell is to be observed in some land univalve shells, as *Bulinus aureus*, where the shell appears to be indifferently dextral and sinistral; but in the genus *Stavelia* it appears more extraordinary on account of the great difference of the form of the two valves.

We have just received from China a large species of *Mutalada* (Pl. XLI. figs. 2, 3), allied to *Unio Grayii* of Lea, which I do not name, as Mr. Cuming informs me that Mr. Isaac Lea is describing and figuring it in Philadelphia*, which offers a curious peculiarity.

These shells have the hinder extremity twisted up on one side somewhat like *Arca tortuosa*, but not so regularly; and unlike that species, the flexure is not always in the same direction: some have the bend towards the right, and the others towards the left of the animal.

I may observe, that, as far as I have been able to examine, the side seems a matter of indifference, for as many of the specimens are bent to the one side as the other.

It is to be observed that in *Arca tortuosa* and *A. semitorta* the hinge-line is always straight, and it is only the basal line which is bent to one side, the valves being slightly unequal, and in fact the shell is not distorted; while in the *Hyria* under consideration the upper edge of the shell is bent as well as the lower one, and the shell is truly altered in form by some external circumstance.

The shells appear as if they had been softened and suddenly twisted on one side. It has been suggested that this change in the form may be produced by the position which the shell occupies in the mud or under the stones near which it lives; but it is to be observed that *Uniones* generally live sunk in the mud, and not lying on one side, and that, like shells which live in an erect position, they have equal valves, while those that live lying on their side almost always have unequal ones; and if the form depended on this circumstance,

* *Triqueta lanceolata* seu *contorta*, Lea.

as the animal must sometimes move and must be sometimes turned over, we ought to find some specimens with the flexure partly on one side and partly on the other, but no such specimens have occurred to me.

I am inclined to believe that it arises from some peculiar predilection of the animal itself, by which it probably more easily obtains its food in the peculiar situation in which it resides.

These shells were sent to England from China by one of Mr. Fortune's collectors. They were accompanied by some specimens of reptiles and insects, on which the Chinese collectors had been exercising their ingenuity in hopes of adding to their value. Thus there was a stuffed specimen of a Night Lizard (*Gecko Reevesii*) which had a square tuft of hair from some mammal stuck on the back of its neck.

A Snake, which had the claw of a mammal surrounded with fur inserted on each side of its neck just behind the head, so as to make it appear as if it had rudimentary feet armed with large claws.

Several of the Coleopterous insects, especially the larger *Cerambyces*, were painted, so as to give them quite a different appearance from the usual and natural colour of the species.

I may add that the work was so coarsely executed as to be discovered on the most cursory examination of the specimens, and could only have been intended to deceive the most ignorant collectors.

3. OBSERVATIONS ON THE GENUS *NERITA* AND ITS OPERCULUM. BY DR. J. E. GRAY, F.R.S., V.P.Z.S., PRES. ENT. SOC., ETC.

The distinction of the species of this genus is rather difficult; therefore whatever assists in dividing the species into smaller groups is of use, as limiting the number of species between which any doubt can be entertained.

Considerable confidence has therefore been placed in the form of the surface of the inner lip, which in some species is smooth, in others tubercular or ridged, or both ridged and tubercular; but in examining a large series of specimens from the same locality, though the character is generally permanent, the tubercles or ridges vary considerably in number and size, and are sometimes almost entirely wanting. It is to be observed that in many of the species which have this part tubercular, the tubercles are more distinct and crowded in the younger, and especially the youngest, than in the older, or what is usually called the more perfectly developed state of the species. In other genera such characters are generally more developed in the shells formed in the most perfect state of the animal. Mr. Adams has formed subgenera on the surface of the inner lip.

My studies on Mollusca have proved to me that few parts offer

more important and better characters for the separation of the families, genera and species, than the operculum. This has been illustrated in the family *Neritidae*.

The family is well characterized by the form of this part, and the possession of the internal apophysis or shelly lobe under the nucleus forming a kind of hinge on the sharp inner lip of the shell.

In my paper in the 'Philosophical Transactions' for 1833, I stated that the structure of the operculum offered the best character to separate the *Neritæ* from the *Neritina*, and I there observed, "The operculum of *Nerita* agrees in form with that of *Neritina*, but differs in having no cartilage on its edge, which is furnished instead with a groove in its outer surface, being covered with a thick, variously formed shelly deposit as in the genus *Turbo*, and in its inner surface being lined with a thick, callous, polished coat. Between the outer and inner coat there exists a very distinct concentrically striated horny layer, like the operculum of *Littorina*, and the left muscular scar is deeply grooved like that of the subannular operculum.

"This difference in the structure of their opercula forms an excellent distinctive character between these two genera."

In the same paper I observed, "The difference in the outer surface of the opercula of the genus *Nerita* affords a good character for the separation of the species."

I have lately had an opportunity of examining a large number of freshly collected *Nerites*, with their opercula dried in the mouth of the shell, so that there can be no doubt that they are the real opercula of the species, and that these opercula have not been put into the mouths of the shells at random, as is too often the case with shells which have passed through the hands of dealers*.

The species may be divided according to their opercula as follows:—

1. *Operculum polished, with a broad, slightly raised, concentrically grooved, submarginal band.* *Nerita*.

N. polita. Costal grooves arched (fig. 1).

N. lineolata. Costal grooves straight (fig. 2).

2. *Operculum polished, with a broad, slightly raised, granulated, submarginal band.* *Ritena*.

N. plicata (fig. 3).

The specimens vary slightly in the distinctness, and especially in the breadth, of the tubercular submarginal band.

3. *Operculum with a broad, raised, convex, smooth, submarginal band.* *Tenare*.

* *Operculum smooth.*

N. Peloronta (fig. 5).

* In Adams's Genera of Shells, t. 42. f. 1, *a, b*, a granular operculum, probably that of *N. signata*, is figured as that of *Nerita polita*.

**** Operculum granular.**

N. ornata (fig. 4). The younger shells have the inner lip more granular, and the adult more ridged.

4. Operculum uniform, granular, without any raised or distinct submarginal band. Natere.

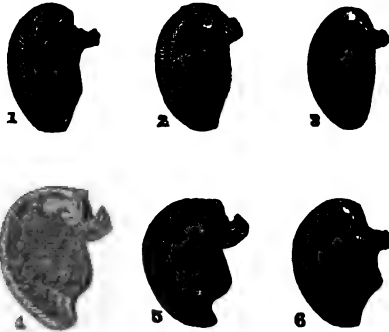
*** Inner lip granulated.**

N. exuvia.

N. Malaccensis.

N. albicilla (fig. 6).

N. Senegalensis.



1. *Nerita polita.*

4. *N. ornata.*

2. *N. lineolata.*

5. *N. Peloronta.*

3. *N. plicata.*

6. *N. albicilla.*

**** Inner lip ridged.**

N. variabilis.

N. Chameleon.

N. versicolor.

N. tessellata.

***** Inner lip smooth.**

N. signata. The granules large, in lines.

N. atra.

N. inconspicua.

The *Puperita pupa*, from the West Indian Seas, has an operculum of a single coat, with a polished surface like *Neritina*. This genus, in the 'Guide to the Mollusca in the British Museum,' is by mistake put in the same section as *Nerita*, instead of that of *Neritina* (see p. 137).

February 23, 1858.

Dr. Gray, F.R.S., V.P., in the Chair.

Mr. Gould brought before the notice of the Society a highly interesting series of birds collected by Mr. A. R. Wallace in the Aroo Islands. Among them were two species of Birds of Paradise—*Paradisæa apoda* and *P. regia*. Hitherto these magnificent birds have only been sent to this country in a mutilated condition, their skins having been prepared and dried by the Papuans frequently without their wings, and almost always without their legs; Mr. Wallace's skins, however, are perfect, and in the highest possible condition. They comprise not only adult males and females, but young birds in various stages of development. Mr. Gould remarked that the ornithology of the Aroo Islands, like that of New Guinea, partook more of the character of the Australian fauna than of any other. The *Picidæ* (Woodpeckers) and *Bucerotidæ* (Hornbills), so common in India and the Indian Islands, are totally wanting, while the *Meliphagidæ* (Honeyeaters) and the *Halcyonidæ* (Kingfishers) are very numerous; on the other hand, the collection did not contain a single *Malurus*, nor any of the *Finches*—forms represented by numerous species even in the northern parts of Australia. Mr. Gould, in remarking upon the beautiful plumes which adorn the *Paradisææ*, stated that he considered they were in their most perfect state just prior to the breeding season, and that the bird was then adorned in its greatest beauty,—a beauty assumed apparently not only for the purpose of attracting the females, but to exhibit to each other their gorgeous finery, when they assemble and perform many curious and extraordinary evolutions. In South America the Cock of the Rock (*Rupicola*) has many singular habits at the like season, while in Australia the Bower Birds attract every one by the curious structures they make for a similar purpose: Mr. Gould instanced also the Peacock, the Turkey, and the well-known Ruff of the British Islands, as birds which assemble and make such displays.

The following papers were read :—

1. NOTES ON SOME BIRDS FROM SOUTHERN MEXICO.
BY PHILIP LUTLEY SCLATER, M.A., F.L.S.

M. Edouard Verreaux of Paris has lately received a very fine series of birds from the *tierra caliente* of Southern Mexico—the same country where the collections made by MM. Sallé and Botteri, which I have already brought before the notice of this Society, were formed. He has kindly submitted to my inspection specimens of such of the species as have not been included in my former lists, concerning which I beg to offer the following remarks, together with a few corrections of statements made in my previous papers on this subject.

1. MICRASTUR GILVICOLLIS.—*Sparvius gilvicollis*, Vieill.; *M. concentricus*, Auct.

A fine specimen in M. Verreaux's Mexican collection agrees perfectly with Mr. Cassin's plate and description of *M. guerilla* (Journ. Acad. Philad. ii. p. 295. pl. 40), and I have no doubt is the same bird. M. Jules Verreaux writes to me that he considered this at first to be the young of *M. concentricus*, though he was afterwards inclined to alter his opinion. Mr. George Gray and Mr. J. H. Gurney, however, both regard this example as referable to an immature stage of *M. concentricus*, and such will probably be found eventually to be the case. The specimen in question has been selected by Mr. Gurney for the Norwich Museum.

2. CICCABA HUHULA (Daud.); Bp. Consp. i. p. 43?

An example, which I am unable to refer otherwise than to this species, has the white feather-margins on the upper surface nearly evanescent, leaving the back nearly uniform slaty black. M. Jules Verreaux, who has examined a second example, considers it as a decidedly different species, probably undescribed; but I should wish to consult a larger series of specimens before determining as new a bird of this difficult group.

3. SCOPS FLAMMEOLA, Kaup.—*Strix flammeola*, Licht. in Mus. Berol.; *Ephialtes flammeola*, Licht. Nomencl. p. 7.

This diminutive species of *Scops* is described by Kaup in a Monograph of Strigidae, which will shortly appear in the Society's Transactions. A single specimen obtained by M. Sallé from the vicinity of Jalapa is in the late Prince Bonaparte's collection.

4. TROGON MASSENÆ, Gould, Mon. Trog. pl. 16.

M. Verreaux's collection embraces fine examples (♂ et ♀) of this splendid species.

5. DENDROCOLAPTES SANCTI THOMÆ. — *Dendrocops sancti thomæ*, Lafr. Rev. et Mag. de Zool. 1852, p. 466.

In M. Verreaux's collection is a fine specimen of this bird, for which I believe M. de Lafresnaye's name is unfortunately chosen, as the present example is from Southern Mexico, and I possess another from Honduras. Besides, I recognize the same species among some drawings by Mr. Bell, of birds obtained on the coast of Mosquitia. I therefore doubt whether it really occurs in the island of St. Thomas, and consider S. Mexico and Central America as its true habitat.

6. CYPHORINUS PROSTHELEUCUS. — *Scytalopus prosthaleucus*, Sci. P. Z. S. 1856, p. 290.

I have already made some remarks on this species, which is by no means a *Scytalopus*, but a *Cyphorinus*, closely allied, if not identical, with Cassin's *C. leucostictus*. See *antea*, p. 63.

7. *GRANATELLUS SALLÆI*, Sclater, P. Z. S. 1856, p. 292.

The Vicomte B. Du Bus having kindly forwarded me a copy of his plate of *Granatellus venustus*, it appears that my bird is certainly a good second species of the genus. Mr. George Gray has also shown me an imperfect specimen of *G. venustus* in the British Museum (where the type of *G. sallæi* is also to be seen), whence the same deduction may be drawn.

8. *CATHARUS MELPOMENE*. — *Turdus melpomene*, Cab. Mus. Hein. p. 5; *Catharus aurantirostris*, Sclater, P. Z. S. 1856, p. 294.

Having forwarded a Mexican specimen of this Thrush to Dr. Hartlaub of Bremen, he informs me that his *C. aurantirostris* from Venezuela is a different species, distinguished by the olive-green of its upper plumage. We may therefore employ for the Mexican bird (which will form a second member of the genus) the specific term *melpomene*, Cabanis' *Turdus melpomene* being doubtless intended for this bird.

9. *PACHYRAMPHUS MAJOR* (Cab.), Sclater, P. Z. S. 1857, p. 78.

This is the bird which I have inserted in the List of M. Sallé's first collection as *P. marginatus*? (P. Z. S. 1856, p. 298).

10. *MYIADESTES UNICOLOR*, Sclater, P. Z. S. 1856, p. 299.

An examination of the specimens of *Myiadestes townsendi* in the collection of the Academy of Natural Sciences of Philadelphia, has shown to me that I was right in considering it different from *M. obscurus* and the present species.

The following is a short description of *Myiadestes townsendi*:—

*Brunnescenti-cinereus, alis caudaque nigricantibus, secundariorum marginibus externis albis; fascia alarum duplici extus apparen-
te pallide fulva: rectricibus duabus utrinque extimis albo
terminatis: annulo oculari albo.*

Long. tota 8·0, alæ 4·4, caudæ 4·0.

M. townsendi was originally discovered by Mr. Townsend on the Columbia river. Dr. Gambel met with it in the mountains between the Rio Colorado and California (Journ. Ac. Philad. i. p. 41), and Dr. Woodhouse found it exceedingly abundant in the Zuni Mountains and from there westwards (see Sitgreave's Report, p. 76). The sexes are coloured alike, as is, I believe, the case in all the species of this genus.

11. *ICTERUS MELANOCEPHALUS* (Wagler), Cassin, B. California, pl. 21. p. 137.

Two different birds appear to have been confounded under the name of *Icterus melanocephalus*. Examples of both these have been forwarded to me by M. Verreaux for examination, and I have likewise specimens of each in my own collection. In general appearance they are much alike; but one (which appears to be Wagler's

species) is rather larger and stronger, and has the greater wing-coverts and secondaries broadly margined exteriorly with white, and has narrow white edgings to the exterior tail-feathers. The other is smaller, weaker, and has the wings and tail uniform black without edgings. This seems to be the bird represented by Mr. Cassin as *Ict. melanocephalus*. He says that the sexes are coloured nearly alike. My specimen of the former bird is from Orizaba, collected by M. Botteri; of the latter from the *tierra caliente*, I believe. An apparently female bird of true *melanocephalus* has the wing- and tail-feathers brown and the general plumage more greenish, but still shows signs of the white edgings of coverts and secondaries. I am not confident as to the real distinctness of these two birds, and for the present forbear to separate them by name; but I cannot avoid acknowledging that they seem to be different.

12. CASSIDIX ORYZIVORA, Cab. Mus. Hein. p. 194.

In M. Verreaux's collection from Southern Mexico are specimens referable to this rather variable species. I have examples also from New Grenada, and it appears to extend over Guiana and Brazil.

13. HÆMOPHILA RUFESCENS, Sw.

The bird described by Prince Bonaparte in the 'Comptes Rendus' for May 12th, 1856, as *Geospizopsis melanotis* (of which I have lately obtained a specimen) is the young either of this species or of *H. superciliosa*, for at present I am unable to distinguish the two satisfactorily. I have already shown that *Geospizopsis typus*, the so-called second bird of the genus, is a female of a species of *Phrygilus* (vide P. Z. S. 1855, p. 160), so that this ugly generic name may be altogether cancelled as useless.

14. GEOTRYGON ALBIFACIES.

Peristera mexicana, G. R. Gray in Mus. Brit.

Peristera albifacies, G. R. Gray in Mus. Brit.

Geotrygon chiriquensis, Bp. Compt. Rend. Orn. Foss. &c. p. 21 (nec *Sclateri*).

Rufo-cinnamomeus, interscapulio purpurascens, alis extus castaneis; pileo toto griseo frontem versus canescente; hoc pure albo: subtus pallide rufescenti-ochraceus, gula albicante, cervice antica et laterali nigro squamulata: pectore plumbeo tincto; remigibus alarum et caudæ rectricibus nigricantibus, his supra brunnescentioribus et (nisi in duabus mediis) albo late terminatis: rostro nigro: pedibus corallino-rubris.

Long. tota 10·5, alæ 6·3, caudæ 3·5, tarsi 1·6.

There has been a great deal of confusion about this Pigeon, caused principally by the practice of publishing names without descriptions, which leaves anybody else who is at work at the same group, the privilege of guessing at what may be the species intended, unless he likes to adopt the safer and more reasonable course of ignoring such

names altogether. This bird is identical with an imperfect specimen in the British Museum, which is named "*Peristera mexicana*" in the 'List of Gallinæ,' &c. published in 1824 (p. 15), and "*Peristera albifacies*" in the 'List of Pigeons' published in 1856 (p. 55), but not described. Prince Bonaparte, making a bad guess at what the bird in question might be, in his 'Conspectus,' part 2, attributed both these names to another bird belonging to a different section, *Leptoptila* (Consp. ii. p. 74. sp. 5), and nearly allied to the *Leptoptila jamaicensis* and *L. rufaxilla*. In the "Additions et Corrections au Coup d'Œil sur l'Ordre des Pigeons," published in the 'Comptes Rendus' for Nov. 1856, the Prince, having discovered his error, proposes to retain the name *Leptoptila albifrons* for the bird so described in his 'Conspectus' (hinting at the same time that it is the same as *Peristera brachyptera* of the B.M. List), and states that the present species of *Geotrygon* is identical with Cabanis' *Geotrygon caniceps*. In this, however, as far as I can make out from the imperfect characters there given, he has fallen into two fresh errors. In the first place, the true *Geotrygon caniceps* of Cuba (Journ. f. Orn. 1856, p. 110) appears certainly distinct from the present *Geotrygon albifacies*. Secondly, the bird described by Prince Bonaparte as *Geotrygon chiriquensis* in the same place (p. 21) is not my *Geotrygon chiriquensis* (P. Z. S. 1856, p. 143), but seems to be the present bird, *G. albifacies*—distinguishable at once from *G. chiriquensis* by the white terminations of the tail-feathers. For my knowledge of this last fact I am indebted to M. Jules Verreaux, who has carefully compared specimens of both the species.

The *Geotrygon albifacies* was obtained by M. Sallé in the environs of Jalapa, and has been received by M. Verreaux from the same part of Mexico. I have taken my characters from a fine example belonging to his collection.

The result of the several papers which I have written on the Ornithology of Southern Mexico gives as inhabiting that country—

1. Accipitres	33
2. Passeres	243
3. Scansores	30
4. Columbæ	11
5. Grallinæ	8
6. Grallæ	22
7. Anseres	7

354 species.

2. NOTE ON THE SKELETON OF THE SHEATH-BILL (*CHIONIS ALBA*). BY T. C. EYTON, Esq., F.L.S.

The general appearance of this skeleton is similar to that of the Plovers; the fissures on the posterior part of the sternum are, however, not quite so deep in proportion to its length, nor is the keel so

broad, but its form is very similar, and distinct from that of other grallatorial birds. It differs from *Thinochorus* (with which I at first thought it might be allied) in having two fissures in the posterior margin of the sternum, *Thinochorus* having but one. On comparing the skeleton with some portion of the skeleton of *Glareola pratincola*, the bones are almost identical in form, particularly the sternum, head and pelvis. I should therefore be inclined to place *Chionis* and *Glareola* in the same family.

Mr. G. R. Gray arranges this form along with the *Thinocorinae* in his order '*Gallinae*;' Prince Bonaparte, in his '*Conspectus Systematis Ornithologiae*' (1854), places it next to the Gulls, in the order '*Gaviae*.'

3. OBSERVATIONS ON THE GENUS CUSCUS, WITH THE DESCRIPTION OF A NEW SPECIES. BY DR. J. E. GRAY, F.R.S., V.P.Z.S., PRES. ENT. SOC., ETC.

(Mammalia, Pl. LXI. LXII.)

Mr. Wallace having sent two specimens of this genus to the British Museum, to determine them I went over the previous observations on the genus, and examined the numerous specimens which are in the Museum collection, received from the French voyages of discovery, Mr. J. Macgillivray, the Naturalist of H.M. Ship '*Rattlesnake*,' and those now sent from the Island of Ula; and I have come to the belief that they are all to be referred to four species, which are very variable in the colour of the fur; one being variable in both the sexes, and the other, in which the sexes differ greatly from each other, but appear to be permanent in their colour; one species in which the furs of the two sexes are alike and uniform in colour; and one, of which the female sex only is known, which is uniform iron-grey.

The two have the ears small, hairy on both sides, and hidden in the fur; the other two have larger ears, exposed beyond the fur and bald within.

Herr Temminck, in the first volume of the '*Monographies de Mammologie*,' published in 1827, divides the short hairy-eared kinds into three species.

At the time he wrote he only had specimens from the northern part of Celebes, brought home by Professor Reinhardt, and from the islands of Banda and Amboyna.

The species evidently depend principally on the colour of the fur, which appears to be very variable in different individuals. It is true that he describes and figures skulls of the different individuals; but the difference between those of *Phalangista chrysorrhoea* and *P. maculata* appears chiefly to depend on the age and development of the specimen figured. M. Temminck and the writers of his school always forget that the skull and other parts of the skeleton are liable to quite as much variation from local circumstances, food,

and other accidental causes, as the colour of the fur or the size of the animal.

1. In *Phalangista ursina* the fur is thicker and closer, and the long hairs thicker than in the other species, blackish, with yellow tips to the longer hairs; and the forehead of the skull is flat. Of this he had several specimens of different ages, all brought by Professor Reinhardt from the northern part of Celebes, the natives of which have not observed any varieties in colouring.

2. *P. chrysorrhoea* is described from two specimens brought home by the same Professor, from some of the Moluccas, which have a short cottony fur, of an ash-grey more or less black, and the rump and upper part of the base of the tail golden-yellow.

3. Of *P. maculata* Herr Temminck particularly observes, that the fur in all ages and in both sexes is covered with irregular white or brown spots, which are paler and less marked in the young. The very young are sometimes entirely ashy. They come from Banda and Amboyna.

The yellow colour of the rump and the base of the tail, as far as the specimens in the British Museum show, is common to the ashy specimens, which might be called *P. chrysorrhoea*, and the variegated specimens, which might be named *P. maculata*: it is very difficult to distinguish the pale-rumped ashy ones from those without that mark; but it is easy to connect the grey or ashy spotted ones with either the one or the other; and it is impossible to separate the ashy-grey spotted ones from the brown or orange spotted specimens. In one specimen the animal is nearly white, with some small dark spots about an inch over; and in another the animal is white, with red feet, and one large red spot on the middle of the back.

From the examination of the specimens in the British Museum, and of their skulls, I am inclined to believe that the *P. ursina* is distinct, and that *P. chrysorrhoea* and *P. maculata* are varieties of the same species.

1. CUSCUS MACULATUS.

Ears almost hidden in the fur, clothed internally and externally with fur; forehead convex; forehead of the skull convex and rounded in front; grinders moderate; fur ashy-grey, or white and grey, or reddish, varied or spotted. Rump and base of the tail yellowish-white.

Phalanger, male, Buffon, H. N. xiii. t. 11.

Phalangista maculata, Desm. N. D. H. N. xxv. 472; Temm. Monog. i. 14. t. 3. f. 1-6; Quoy & Gaim. Voy. Uran. Zool. 59. t. 7; Waterh. Mamm. i. 274. f.

Phalangista ursina, part., Waterh. Mamm. 267.

Phalangista chrysorrhoea, Temm. Monog. i. 12; Waterh. Mamm. i. 271.

Cuscus maculatus, Lesson & Garnot, Voy. Coq. Zool. 150. t. 4.

Cuscus macrourus, Lesson & Garnot, Voy. Coq. Zool. i. 156. t. 5; Waterhouse, Mamm. i. 277.

Hab. New Guinea.

Chrysorrhos would perhaps be the better name for this species, because all I have seen have a yellow rump and base of the tail, but some are not spotted.

Of this species we have in the British Museum—

1. Adult female, from the Moluccas, from the Leyden Museum, sent as *C. chrysorrhos*. Uniform ashy-grey; face, throat, chest, and beneath the rump and base of the tail yellowish.

2. Young female, from the south coast of New Guinea. Presented by J. B. Jukes, Esq. Dark blackish-ashy; head, neck and shoulders paler; rump and base of the tail reddish-yellow; cheeks, throat and beneath white; feet bright red.

The two sides of this specimen are not coloured alike. The forehead of the *skull* is very convex.

3. Half-grown "male from Darnley Island, brought from the south coast of New Guinea." Presented by J. Macgillivray, Esq. Reddish; back and thighs darker blackish-ashy; cheeks, throat, under side, large confluent spots on the sides, the rump and tail white; feet bright red. Like *Cuscus maculatus*, Quoy and Gaimard, Voy. Uranie, t. 7.

4. Half-grown "male from New Guinea." Presented by J. Macgillivray, Esq. Like the former, but white, with irregular large symmetrical pale reddish spots on body, limbs and tail.

5. Half-grown "female from Dufaure Island, south coast of New Guinea." Presented by John Macgillivray, Esq. Like the former, but white, with one very large reddish spot on the hinder part of the back; two large spots on the hind legs, and an obscured indication of a large patch on the shoulders; the feet red.

6. Half-grown, from the "island of Waygeroo." From M. Verreaux. Ashy-grey cheeks; back with some white spots; throat, chest, belly, rump and tail white; sides white, with scattered, round, nearly equal-sized spots; feet reddish.

7. Adult male. Aru Island. Sent by Mr. Wallace. White; body and limbs with small, roundish, rarely confluent, black-ashy spots; feet white: the skull has a very convex forehead.

Cuscus maculatus, Lesson, Voy. Coq. t. 4, is intermediate in colour and marking between Nos. 7 and 3.

Cuscus macrourus, Lesson, Voy. Coq. t. 5, from the island of Waygeroo, bears a great similarity to No. 3; but the reddish spots are less confluent.

The figure of *C. Quoyi*, in Quoy and Gaimard, Voy. Uranie, t. 6, looks like a specimen of this species intermediate between the ashy and spotted variety, being ashy with darker obscure spots.

2. CUSCUS BREVICAUDATUS.

The ears hid in the fur, woolly internally and externally; tail short; the forehead — ?; the front lower cutting-teeth broad.

Female uniform ashy-grey ; rump and base of tail, throat, chest and belly yellowish dirty-white.

Phalangista nudicaudata, Gould, Proc. Zool. Soc. 1849, 110.

Hab. Cape York.

This species is only known for "a female two-thirds grown, sent from Cape York" to the British Museum by John Macgillivray, Esq.

It is very like the ashy variety of *C. maculatus*, but the front lower cutting-teeth are much broader, and the tail, which has the bones still remaining on it, is considerably shorter than any of our specimens of *C. maculatus*.

The specimen in the British Museum is that described by Mr. Gould.

Mr. Gould refers this animal to the subgenus *Pseudocheirus* of the genus *Phalangista*, and calls it *P. nudicaudata*, because it "differs from all the other Australian members of the genus in having the apical three-fourths of its tail entirely destitute of hair." But Mr. Gould overlooked the fact that it is not a *Pseudocheirus*, but a *Cuscus*, all the species of which have the major part of the tail naked ; and the species under consideration has the naked part of the tail, and indeed the tail itself, shorter than the rest of the species ; so that the specific name of *nudicaudata* is singularly inapplicable.

The light mark on the rump, which Mr. Gould compared to that of the *Koala*, is also common to the species of *Cuscus*, and is probably produced by the habit of the animal sitting on its rump, rolled up into a ball, on the fork of the branches of trees.

The skull shows that the animal is much younger than the label indicates, as it appears only to have the milk teeth, and the broad lower incisors of the younger specimens of this genus. The skull differs both from that of *C. ursinus* and *C. maculatus*, but it is too young to predict what may be the normal form of the adult animal.

The front half of the space between the eyes is rather convex, but not nearly so much so as the young skull of *C. maculatus* ; and the front of the forehead just behind the convexity described is rather concave ; this concavity has no resemblance to the deep concavity occupying nearly the whole space between the eyes in *C. ursinus* and *C. maculatus*.

3. *CUSCUS URSINUS*.

Ears almost hidden in the fur, clothed with fur internally and externally ; fur blackish-ash, with larger silvery hairs ; head, throat, belly and tail rather pale brown ; forehead flat, concave ; forehead of the skull flat, deeply concave ; grinders large, in a strongly-arched series.

Phalangista (Ceonix) ursina, Temm. Monog. i. 10. t. 1. f. 1-3 ; t. 2. f. 1-5, skull ; t. 3, skeleton ; Lesson, Cent. Zool. t. 10 ; Waterhouse, Mamm. i. 267, part.

Hab. Celebes.

We have in the British Museum only a single specimen of this species with its skull, which was obtained from the Zoological Society,

and is the specimen described by Mr. Waterhouse in *Mammalia*, i. p. 268. The other specimen there indicated as being in the British Museum is a young *C. maculatus*.

In Lesson's figure in *Cent. Zool.* t. 10, it is represented as uniform blackish-brown, with rather large white-edged ears!

The larger size of the teeth and the flatness of the forehead at once separate this from *C. maculatus*.

3. *CUSCUS ORIENTALIS* (Pl. LXI.).

Ears produced beyond the fur, naked internally; forehead concave. Male white. Female pale reddish-brown, with a darker longitudinal streak; skull with a narrow concave forehead; grinders moderate.

♀ ♂ *Phalangiata cavifrons*, Temm. Monog. i. 17.

♀ ♂ *Cuscus orientalis*, Gray, List Mam. B.M. 84.

♀ ♂ *Phalangiata (Cuscus) orientalis*, Waterh. Mamm. i. 279.

♂ *Coescoes*, Valentyn, Omst. in Amboyna, iii. 272.

Phalanger, Penn. Quad. ii. 27.

♂ *Didelphis orientalis*, Pallas, Misc. Zool. 59; Schreb. Saugth. iii. 550. t. 152.

♂ *Cuscus Amboinensis*, Lacép.

♂ *Phalangiata alba*, Geoff. Cat. Mus.

♂ *Cuscus albus*, Lesson & Garnot, Voy. Coq. Zool. i. 158. t. 6.

♂ *Balantia orientalis*, Illiger, Prod. 78.

♀ *Phalangiata rufa*, Geoff. Cat. Mus.; Desm. N. D. H. N. xxv. 473.

♀ *Phalanger*, female, Buffon, H. N. xiii. t. 10.

Cuscus Quoyii, Lesson, Mam. 226.

Phalangiata Quoy, Quoy & Gaim. Voy. Uranie, Zool. 58. t. 6??

Phalangiata Quoy, Temm. Mon. Mamm. i. 17.

Phalangiata Papuensis, Desm. Mam. Supp. ii. 541; Bull. Sci. Nat. iii. 64.

Phalangiata (Cuscus) maculata, part., Waterhouse, Mam. i. 275.

? *Cuscus albus*, Leason, Voy. Coq. t. 6, ♂?

Of this species we have in the British Museum—

1. Adult male, from New Ireland, procured from M. Verreaux of Paris; said to have come from one of the expeditions. Pure white; throat yellow; feet nearly bald.

2. A nearly adult male, from the old collection, said to have come from Amboyna. White.

3. Young male? Uniform pale brownish-yellow; throat, chest and belly whiter. From island of Waygeroo; procured from M. Verreaux of Paris.

4. Adult female: ashy-brown, glistened with silvery; throat, chest and belly pure white; back with a narrow uniform longitudinal streak. This is sent as *Cuscus Quoyii*, Lesson, Mam. 220; *Ph. Papuensis* of Desmarest, Supp. The figure of M. Gaimard's animal

in the 'Voyage of the Uranie,' t. 6, is more like a variety of *C. ursinus*; but the description agrees with our animal.

5. Young female, from the island of Waygeroo; procured from M. Verreaux.

6. Young female, from Aru Islands; procured from Mr. A. R. Wallace. These two only differ from the adult specimen in the silvery hairs of the back being rather more abundant, but they seem to be deciduous.

Phalangista Papuensis of Desm. was described from a female specimen collected by M. Gaimard, which was afterwards described as *Ph. Quoyi*. In Quoy and Gaimard, 'Zoology to the Voyage of the Uranie,' it is described as having a darker dorsal line, which rather widens over the loins, which at once shows that it must be the female of *P. orientalis*.

Mr. Waterhouse has referred both these names without any comment as a synonym of *P. maculata*, misled probably by Herr Temminck, who (Mon. Mamm. i. 18) states it to be a young *P. maculata*—evidently overlooking the dorsal stripe.

Lesson, in the 'Voyage of the Coquille,' figures a male animal as *Cuscus albus*, t. 6, from Port Praslin, New Ireland, which is white, with a narrow black streak, just as in the female of this species.

Knowing the little authority that is often to be placed on M. Lesson's figures, I suspect it is the figure of a pale or perhaps bleached specimen of a female *P. orientalis*, in which some fold of the pouch, probably produced from bad stuffing, has been mistaken by the artist for the scrotum of a male.

4. *CUSCUS CELEBENSIS* (Pl. LXII.).

Ears produced beyond the fur, naked internally. Male and female alike, ashy-grey, grizzled with silvery hairs; the nape and the upper part of the middle of the back blacker, but without any distinct dorsal streak.

Cuscus Celebensis, Brit. Mus.

Hab. Celebes.

We have of the species—

1. Young animal, from the island of Macassar; procured from Mr. J. R. Wallace in 1851.

2. Adult male and female, from San Cristoval, Soloman Group of Islands, Dec. 1855. Presented by John Macgillivray, Esq. and F. M. Rayner, Esq. in 1856.

4. LIST OF SPECIES OF MAMMALIA SENT FROM THE ARU ISLANDS
BY MR. A. R. WALLACE TO THE BRITISH MUSEUM. By
DR. J. E. GRAY, F.R.S., V.P.Z.S., PRES. ENT. SOC., ETC.

(Mammalia, Pl. LXIII. LXIV.)

Mr. A. R. Wallace has lately sent to Mr. Samuel Stevens a collection of Mammalia and Birds from the Aru Islands, referred to in his paper on the Natural History of those islands in the 'Annals and Mag. Nat. Hist.' 1857, which has been transferred to the British Museum, and forms a most important addition to the collection of that establishment.

His list does not contain a single Bat.

In the 'Zoology of the Voyage of H.M.S. Samarang' I gave a list of the Mammalia which had up to that period been found in New Guinea (p. 31); and in Dr. Müller's 'Verhandlingen' is a similar list.

Besides the animals sent home by Mr. Wallace from the Aru Islands, there are recorded in these lists—

1. DENDROLAGUS URSINUS. B.M.

Dendrolagus ursinus, S. Müller, Verh. 131, 141. t. 19. f. 22, 23.
Hypsiprymnus ursinus, Temm. Faun. Japan.

2. DENDROLAGUS INUSTUS. B.M.

Dendrolagus inustus, S. Müller, Verh. 131, 143. t. 20, 22, 23.

3. DORCOPSIS ASIATICUS. B.M.

Dorcopsis Brunii, Müller, Verhand. 131.
Dorcopsis Asiaticus, Gray, Voy. Sam. 32.
Filander or *Kangaroo*, Le Brun's Voyage, i. 347. t. 213, 1714.
Didelphis Asiaticus, Pallas, N. A. Petrop. 1777, 228. t. 9.
D. Brunii, Gmelin.
Halmaturus Brunii, Illiger, Prod.
Hypsiprymnus Brunii, Müller, Verh. 63. t. 21-23.
Island of Aru.

It is curious that this animal, described as specially inhabiting the island visited by Mr. Wallace, was not sent home by him. It is to be hoped that he did not neglect it, thinking it a common Kangaroo, as it is a desideratum in most museums in Europe.

The specimen of this animal in the Leyden Museum is said to be from the continent of New Guinea, where the two species of *Dendrolagus* and the *Antechinus melas* were also found.

4. PHASCOGALE (ANTECHINUS) MELAS.

Phascogale (Antechinus) melas, Müller, Verhand. t. 25. f. 1-3.
From New Guinea.

Differs according to the figure in having the hair of the tail rather

more elongated and spreading than the Australian species of the genus; the dentition is more nearly allied to the *Antechinus* than to the new genus *Myoictis* sent home by Mr. Wallace.

5. *HALICORE AUSTRALIS*.

B.M.

Halicore Australis, Owen in Jukes's Voyage of the Fly, ii. 323. f. 135, 1847; Gray, Voy. Samarang, 33.

Hab. Timor Straits.

6. *SUS PAPUENSIS*.

Sus Papuensis, Lesson, Voy. Coquille, t. ; Müller, Verh. t. .

Hab. New Guinea. Called 'Bene.'

A species which has not yet reached England.

The following animals sent home by Mr. Wallace do not occur in the list; indeed it does not contain a single Bat: viz.—

1. *Hipposideros Aruensis*.
2. *Pteropus argentatus*.
3. *Dactylopsila trivirgata*.
4. *Myoictis Wallacii*.

VESPERTILIONIDÆ.

1. *PTEROPUS ARGENTATUS*.

B.M.

Back white, with scattered black hairs; beneath yellowish; face grey, nakedish; head deeper yellow-grey, with black interspersed hairs; collar broad, bright red-chestnut, darker brown at the sides and under side, where the hair is longer, forming a kind of ruff; ears and membranes (when dry) black.

Hab. Aru Island. Female.

"Back of a silky or silvery shining white, very beautiful in the freshly killed animals."—*Wallace*.

HIPPOSIDEROS.

As M. Bonaparte has given the name of *Phyllorhina* to the European Horse-shoe Bats, I am inclined to restrict the genus *Hipposideros* to those species of the larger genus which have a large cavity opening with an expanding pore on the forehead behind the transverse hinder part of the nose-leaf; they have distinct pubal teats; thus restricting *Phyllorhina* to those which have a simple forehead without any pore.

2. *HIPPOSIDEROS ARUENSIS*.

B.M.

Sooty-brown; the lower half of the hairs of the back paler; the hairs of the under side more uniform, or with rather paler tips; the ears large, broad, rounded at the ends, with two hairy lines on the inner side of the front edge; face and chin rather bristly, without any membranaceous ridges on the sides outside of the nose-leaf.

Hab. Aru Islands. "Male."—*Wallace*.

Length of head and body 2"; tail $\frac{5}{8}$; expanse of wings $5\frac{1}{4}$; length of upper arm bone $1\frac{1}{4}$; length of shin bone $\frac{5}{8}$ inch.

The ears sooty-black; the front margin of the ears is broad, with a rounded lobe on the basal part near the forehead; wings broad, thin, sooty-black, bald; thumb slender, of two subequal joints; the interfemoral membrane broad, truncate at the end; the hind legs slender, rather elongate; feet slender, enveloped in the membrane to the base of the slender equal compressed toes; the heel-bones elongate, longer than the foot; tail elongate, slender, attached and extending a little beyond the end of the truncated interfemoral membrane.

Cutting teeth $\frac{1-1}{4}$; upper large, chisel-shaped, separated by a small space from each other and from the canines; the lower small, crowded, three-lobed; canines conical; grinders — ?

The specimen is unfortunately rather injured about the face; but it appears quite distinct in form from any of the Horse-shoe Bats I have hitherto observed.

This species appears to be quite distinct from *Hipposideros speoris* of Timor, which is described as being a little larger than the larger English Horse-shoe Bat, *Phyllorhina bifer*; it has the following synonyma :—

Vespertilio speoris, Schneid. in Schreb. Saugth. t. 59; B. Shaw, Zool. i. 147.

Rhinolophus marsupialis, Geoff. Cour. 1805.

Rhinolophus speoris, Geoff. Ann. Mus. xx. 261. t. 5. 266; Desm. N. D. H. N. xl. 368; Mam. 126; Fischer, Mam. 139.

Rhinolophe cruménifère, Péron & Lesueur, Voy. aux Terres Aust. Atlas, i. t. 35.

Hab. Timor (Péron and Lesueur).

It is certainly distinct from *Hipposideros insignis*, Gray, Mag. Zool. & Bot. ii. 492, the *Rhinolophus insignis*, Horsf. Java, *Vesp. cyclope*, Deschamps, MSS., from Java, which Fischer confounded with the former, and which has acute ears on the sides of the face, numerous lamellæ under the front part of the nose-leaf, and is $13\frac{1}{4}$ inches in expanse of wings.

Fam. KANGEROIDÆ.

3. CUSCUS MACULATUS.

Phalanger, male, Buffon, H. N. xiii. t. 11.

Phalangista maculata, Desm. N. D. H. N. xxv. 473; Quoy & Gaim. Voy. Astrol. t. 7.

Cuscus maculatus, Lesson & Garnot, Voy. Coq. Zool.

Cuscus macrourus, Lesson & Garnot, Voy. Coq. Zool. 150. t. 4.

Grey or black and white, variegated, without any dorsal streak.

Hab. Aru Island.

Two skulls, male.

The specimen sent is white, with scattered black spots, more abundant on the middle of the back and sides.

4. *CUSCUS ORIENTALIS*. (Pl. LXI.)*Cuscus Quoyii*, Lesson, Mam. 220.♀ *Phalangista Quoyii*, Quoy & Gaimard, Voy. Uranie, Zool. 38 (t. 6? ?).*P. maculata*, part., Waterhouse, Mamm. i. 274.*P. Papuensis*, Desm. Supp. 341.

Brown, grizzled, with a few white-tipped hairs, with a narrow black dorsal streak.

Hab. Aru Island. "Female," young.5. *BELIDEUS ARIEL*.*Belidea Ariel*, Gould, Proc. Zool. Soc. 1842, x. 11.*Pelaurus sciureus*, Müller, Verhand. tabl.*Hab.* Aru Island.

Female adult, with one young in the pouch.

DACTYLOPSILA.

Tail elongate, slender, depressed, densely clothed with fur, with the exception of the under side near the tip, which is bald and callos, the end rather bushy. Ears elongate, rounded, bald, except at the outer sides of the base. Pupil round? The fore-feet elongate; toes very slender, compressed, very unequal in length, quite free; the outer and third or middle toe nearly equal, the second or ring-finger much the longest, the fourth and fifth short, the fifth or innermost the shortest. The hind-feet slender, toes compressed, the two outer toes elongate, nearly equal, the two inner about half the length and united.

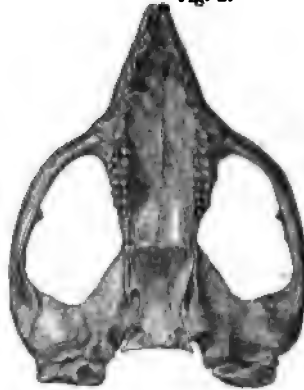
Skull (figs. 1, 2, 3) depressed, very broad, with very large expanded zygomatic arches; the face narrow, compressed and nearly erect on the side, tapering in front; the palate is narrow, concave. The cutting teeth $\frac{4-4}{4-4}$; the upper front elongate, projecting in front, rather tapering and truncated at the tip; the second and third compressed, chisel-shaped, close together and to the front; the second small, the third larger; the fourth separated from the others by a small space and placed on the intermaxillary suture, compressed, curved rather like a canine; the lower front very long, projecting in front, curved, rather tapering at the tip; the second, third and fourth small, truncated, separated from each other, the second largest close to the base of the front tooth; the third small, separated from the second by a small space; the fourth very small, far from the other; and at the base of the front edge of the first grinder, in the space between the third and fourth on the right side of the jaw, is a cavity which appears to have been filled with a tooth like the third one, but there is no appearance of the tooth or cavity on the other side. Canines? $\frac{1-1}{\frac{1}{2}-\frac{1}{2}}$, upper small, compressed, conical, tapering like, but smaller than, what I have called the hinder cutting teeth (fig. 3). Grinders $\frac{5-5}{4-4}$, small, in two nearly straight lines parallel to each

other, and the hinder ones in each jaw rather smaller than the front ones; the front upper small, triangular; the others are four-sided and square, with four tubercles, the outer front tubercle of the second tooth being rather larger than the rest, which are nearly equal among themselves, and the front lower grinder has only one larger tubercle in the place of the two in the others (figs. 4, 5).

Fig. 1.



Fig. 2.



This genus is very distinct from the other genera of *Phalangistina*, in the elongated and depressed form of the tail, the formation of the fore-feet, and especially in the disposition and form of the teeth, as well as in the broad depressed skull.

Fig. 3.



Fig. 4.



Fig. 5.



The following observations may assist in showing the value of these characters.

In *Cuscus* the fingers are rather longer than in *Hepoona*, and the third or middle finger is the longest, the others becoming gradually shorter on each side.

In *Phalangista* proper (that is *Trichosurus* of Mr. Waterhouse) the fingers are moderately long, the second and third are the longest and equal, the fourth longer than the first, and the fifth or inner one the shortest.

The hand of the *Hepoona* is very like that of *Phalangista*, both in the proportion and form of the fingers; but the two inner fingers are rather separated and opposable to the other three.

The tail though covered with hair is very unlike those of the genera *Hepoona* and *Phalangista*, and is more like that of a squirrel, but not so bushy; in *Hepoona* it is tapering and covered with shortish hair, and has a slender tip; in the more perfect specimen of *Phalangista* it is cylindrical and equally covered with hair on all sides.

In *Hepoona* and *Phalangista* the grinders are placed in arched series, and they are much larger compared with the size of the skull than in this genus, and the hinder grinders are larger than the front ones; the front grinder in the upper jaw is larger, more elongate, and compressed.

6. DACTYLOPSILA TRIVIRGATA (Pl. LXIII.).

White; three broad black stripes on the back, the outer ones commencing on the side of the nose, enclosing the eyes, and continued along the side of the back; the central one commencing on the crown and continued to the end of the tail, being narrower at the base of the tail: a large black square spot on each side of the chin, separated by a narrow central line; a large spot on the upper surface of each leg; the sides of the throat are greyish, and the sides of the body are rather greyish from the dark colour of the base of the fur on that part of the body; the tip of the tail is whitish, and the under part of the upper surface near the tip, with a narrow streak ending some way down the middle of the under side of the tail, black; the under side of the tip of the tail is bald, without hair, but scarcely callous; the feet flesh-coloured, with few scattered short whitish hairs; the ears nakedish, black when dry.

Hab. Aru Island.

A female: lives on fruit. "Teeth $\frac{20}{18}$." (*Wallace.*)

MYOICTIS.

Head tapering; nose acute; whiskers strong. Tail depressed, tapering, clothed with rather elongated hairs above and on the sides; the under side flat, nakedish. Feet moderate; soles bald to the heel; toes 5.5, free, compressed; claws acute; first and fifth front toes equal; second, third and fourth toes equal, longer; hinder toes free, weak, distinct, clawless; thumb of hind-foot larger. Ears roundish, nakedish. Scrotum pendulous.

Cutting teeth $\frac{4-4}{6}$; the upper with a central space in front between them, in a close series on each side, and with a small interspace between them and the canines; the first tooth very small, hid in the gums, the others all equal, lancet-shaped, rather crowded; the lower

forming a continued series, shelving forward, all lancet-shaped, sub-equal; the front rather the longest and narrowest; the hinder rather broader.

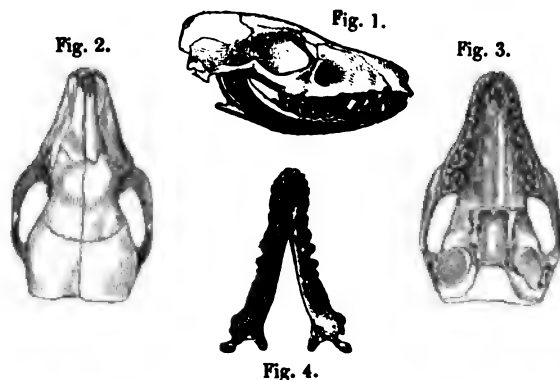
Canines $\frac{1-1}{1-1}$, conical; the upper not quite developed, only slightly produced above the level of the other teeth; the lower small, conical scarcely raised above the other teeth (figs. 3, 4).

Grinders false, $\frac{2-2}{2-2}$, conical, compressed; the lower with a very obscure, the upper with a rather more distinct, conical tubercle on the front and hinder edge (figs. 3, 4).

The true grinders $\frac{2-2}{2-2}$; the upper large, triangular, acutely lobed; the lower compressed, very acutely lobed; the middle one in each jaw the largest.

The angle of the lower is produced, elongate and strongly inflexed, as is usual in *Marsupialia*.

Skull: length, 1 inch 3 lines; width, all the zygomatic arch, 9 lines; length of the tooth-line 9 lines. Length of the lower jaw $11\frac{1}{2}$, of symphysis $4\frac{1}{2}$, of tooth-line $7\frac{1}{2}$ lines (figs. 1, 2, 3, 4).



This genus is peculiar, because, as far as the dentition is concerned, there is no character by which we should have determined that it was a Marsupial animal; but the form of the angle of the lower jaw at once shows its true affinity to that group. It was not until a most careful examination of the space between the front upper cutting teeth, that I could find any indication of the front pair of cutting teeth found in the allied genus *Antechinus*.

This genus is evidently allied to the genus *Antechinus* of Australia; but it is known at once by its external form, which is just that of a small Indian *Herpestes* or *Ichneumon*, having like that genus a depressed tail with long spreading hair, broad and depressed at the base, tapering to an acute tip which bears a pencil of hairs.

7. MYOICTIS WALLACHI (Pl. LXIV.).

Rusty-brown, with interspersed black longer hairs; head redder; throat, chest and belly pale reddish; side of the neck at the base of

the ears bright reddish ; ears, and the greater part of the tail bright red-brown ; tip of the tail black.

Hab. Aru Island.

Male.

"In houses as destructive as rats to every thing eatable.

"Teeth 34 :—Inc. $\frac{6}{6}$; C. $\frac{1-1}{1-1}$; Prem. $\frac{2-2}{2-2}$; M. $\frac{2-2}{2-2}$."—*Wallace*.

8. PERAMELES (ECHIMIPERA) DOREYANUS.

Perameles Doreyanus, Quoy & Gaimard, Voy. Astrol. Zool. i. 100. t. 16. f. 1-5 ; Waterhouse, Mam. i. 386.

Echymipera Kalulu, Lesson, Règ. Anim. 192.

Tail naked, rugose, squamose, wrinkled below. Toes 3·5 : the two inner front large, equal ; the outer small ; the inner hind toe short, clawless ; the two index fingers small, united, clawed.

Hab. Aru Island.

Female.

"The skin is very thin and friable.

"Teeth 46 :—Inc. $\frac{8}{8}$; C. $\frac{1-1}{1-1}$; Prem. $\frac{3-3}{3-3}$; M. $\frac{4-4}{4-4}$."—*Wallace*.

This enumeration agrees with that given by MM. Quoy and Gaimard, being two cutting teeth in the upper jaw less than are found in the other species of the genus ; hence Lesson considered it as a genus.

The outer and inner toes of the forefeet are very small, rudimentary and clawless.

9. PARADOXURUS HERMAPHRODITA.

Hab. Ké Islands.

Is in the collection : it only appears to be a variety of the very variable and extensively distributed *Paradoxurus hermaphrodita*.

5. DESCRIPTION OF APHROCERAS, A NEW GENUS OF CALCAREOUS SPONGIADÆ BROUGHT FROM HONG-KONG BY DR. HARLAND. BY DR. J. E. GRAY, F.R.S., V.P.Z.S., PRESIDENT ENT. SOC. ETC.

(Radiata, Pl. X.)

APHROCERAS.

Sponge tubular, branched, without any large superficial oscules, formed of two distinct coats, externally covered with simple fusi-form calcareous spicula, placed side by side in the longitudinal axis of the stem and branches, forming an even coat ; inner surface of the tube lined with a minute network of interlaced fibre placed in all directions ; branches simple, tapering, attenuated at the tip, with a round terminal contracted aperture.

The spicula are entirely dissolved in dilute muriatic acid, leaving the form of the sponge marked by the internal network and the sheaths

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of the spicula on the surface. When treated with caustic potash, the internal network is destroyed, leaving only the external spicula placed side by side.

This genus is allied to *Grantia*, but it is easily distinguished by the uniform fusiform shape and the disposition of the spicula.

APHROCERAS ALCICORNIS. (Pl. X.)

Hab. Hong-Kong (*Dr. Harland*).

This species somewhat resembles *Grantia botryoides* in appearance and habit; but in that species the spicula are all *triradiate*, which appears to be the generic character of the genus *Grantia* as I propose to restrict it.

6. ON APHROCALLISTES, A NEW GENUS OF SPONGIADÆ FROM MALACCA. BY DR. JOHN EDWARD GRAY, F.R.S., V.P.Z.S., PRESIDENT ENT. SOC.

(Radiata, Pl. XI.)

In 1842 we received from Captain Sir Edward Belcher a Sponge which he obtained in Malacca, which evidently forms a new genus nearly allied to the *Euplectella* of Professor Owen. I therefore have great pleasure in bringing a description of it before the Society.

APHROCALLISTES.

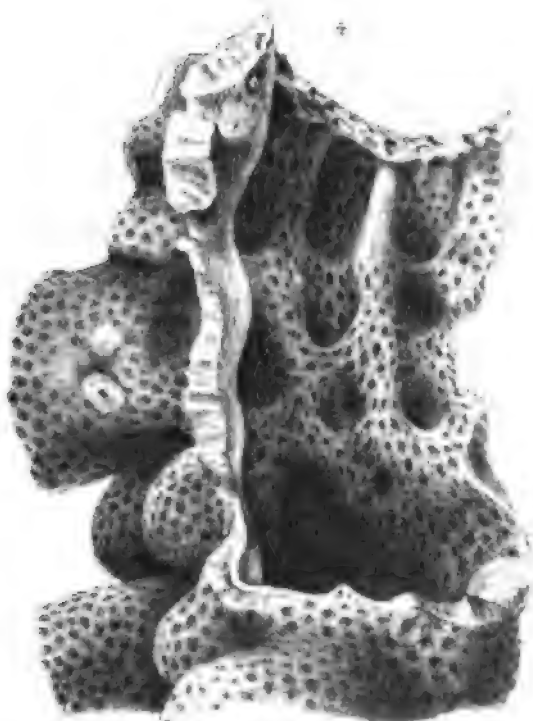
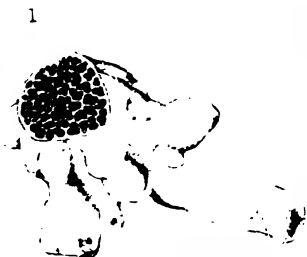
The sponge cylindrical, tubular, branched; the end of the main tube closed with an open network formed of spicula; branches cylindrical, simple, rarely bifid, rounded and closed at the end; the inner surface of the tube with large unequal-sized concavities placed in longitudinal series, having a large roundish oscule near its lower edge.

The sponge hard, calcareous*, with uniform, close, equal, regular hexangular pores on the surface, and larger round ostioles in series on the sides of the main tube. The outer surface formed of inter-tangled transparent spines, which inosculate and unite with each other at the intersection, forming a hard, rather brittle crust. The inner surface lined with a coat of fusiform transparent spicula, which are placed in bangles parallel to each other in the spaces between the roundish internal apertures of the crowded small superficial pores.

This genus is very like *Euplectella* of Professor Owen in its external form, and especially in the upper part of the tube being closed with network.

It differs from that genus in being more irregularly formed and branched, and in the structure and calcareous composition of the sponge itself.

In that genus the basis of the tube is formed of ropes of elongated spicula placed at right angles longitudinally and transversely to the



APHROCALLISTES BEATRIX Gray.
1.3. Natural size. 2.4. Magnified

4



3



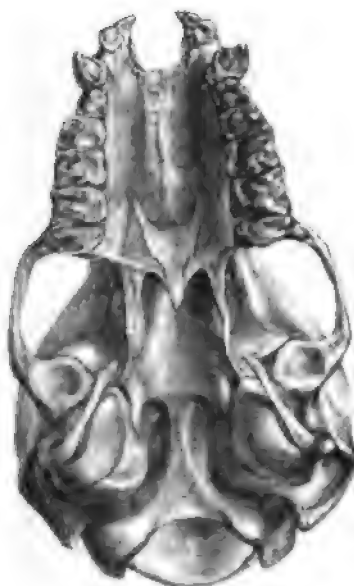
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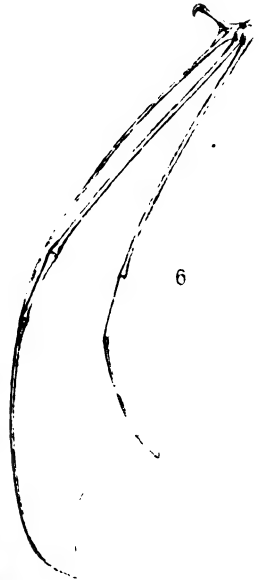
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6



8



W. West camp

1 2. MINIOPTERIS SCHREIBERSII Natt. sp
3 to 8 M. ELEPHOTIS Tamm. sp

axis of the tube, and covered with a more or less thick coat of smaller spicula. In this genus the mass of the sponge is formed of small spicula, which inosculate and are united together, forming a rather hard mass pierced with numerous closed, small, uniform hexangular pores, lined internally with a thin layer formed of elongate fusiform spicula placed parallel in bundle in a more or less longitudinal direction round the inner mouth of the pores.

The main tube is smaller at the base, gradually enlarges upward, and is then subcylindrical and irregular on the surface.

When examined externally, eight or ten longitudinal ridges are observed, between which are placed a more or less regular series of unequal-sized squarish concavities; at the lower edge of each is to be observed a large round oscule, commencing with the outer surface.

APHROCALLISTES BEATRIX. (Pl. XI.)

Hab. Malacca.

We have in the British Museum an imperfect specimen of *Euplectella*, which was brought home by Capt. Sir Edward Belcher at the same time as the above.

March 9, 1858.

Dr. Gray, F.R.S., V.P., in the Chair.

The following papers were read:—

1. A MONOGRAPH OF THE GENUS *MINIOPTERIS*.

BY ROBERT F. TOMES.

(Mammalia, Pl. LXV.)

Perhaps there is no order of Mammalia in which there is so great a diversity in the forms of the different species as in the *Cheiroptera*. On examining the genus *Vespertilio* in the extended form in which it is given by M. Temminck, and more recently by M. Wagner, the naturalist will find an assemblage of creatures which he will have great difficulty in making out to his satisfaction. But in endeavouring to separate them into groups or genera for the purpose of description, he will be equally puzzled. An examination of the British species merely, will illustrate the nature of the difficulty to which I refer. Take, in the first place, the common *Noctule Bat*, and the equally common *Whiskered Bat*, the one exhibiting a heavy muscular body, and strong wings capable of vigorous and sustained flight, and with jaws and teeth of sufficient size and power to masti-

cate a Cockchafer whilst on the wing with perfect ease; and the other species having a slight and feeble body, with very slender wing-bones supporting a membrane of equal delicacy, suited only for flight in sheltered spots, and with a muzzle and teeth of such small size as to be fitted only for taking minute food in such situations.

The difference between the two is quite sufficient to justify generic separation, and the work is easy so far as these two species are concerned; but unfortunately a whole host of species come in between them, and bring such a series of small modifications as to reduce the distinction to one of *degree* only; so that in attempting to separate them the results are anything but satisfactory. And it is scarcely necessary to go beyond the European list to meet with an unbroken series from the one to the other. Under these circumstances, any character which could be found sufficiently marked to show a difference apart from that of *degree*, however small it might be, would be valuable as a means of classification.

In default of any single character which might be considered sufficient for this purpose, a certain combination of characters, not in themselves sufficiently distinctive taken separately, might nevertheless, if taken collectively, answer the desired end; and further, the decision would be strengthened if we were to find that these characters were so precisely uniform in *degree*, as to afford no specific differences beyond those of the size of the animal and the quality and colour of the fur.

Such is literally the case with the group which I have now to consider. Although inhabiting widely separated localities—Europe, Asia, Africa and Australia,—its several members scarcely exhibit any greater differences than those above noted, viz. colour and size.

The genus *Miniopterus* was first proposed by Prince C. L. Bonaparte in his fine work on the Fauna of Italy, for a species which was there described as *Miniopterus Ursinii*, being regarded as new. It has however been subsequently shown by M.M. Keyserling and Blasius, that this species is identical with the one described a long time previously by Natterer, in Kuhl's 'Memoir on the Bats of Germany,' under the name of *Vespertilio Schreibersii*. The specific name given by Natterer is the one now generally admitted, whilst the generic one given by Prince C. L. Bonaparte is refused or adopted according to the opinion respecting the generic distinctions.

In the following monograph the generic peculiarities will first be pointed out; and this will be followed by a detailed description of the earliest-described and best-known species—the European one,—after which the points of dissimilarity in the other species will be adverted to*.

* I am aware that some zoologists regard the Asiatic and African representatives of the genus as referable to the European one, an opinion in which I partially concur. The African one, *Vespertilio dasythrix* of Temminck, is I believe identical with *Miniopterus Schreibersii*; but the Asiatic ones occurring in the islands of the Indian Archipelago and in Australia, I believe to be perfectly distinct species.

Genus **MINIOPTERIS**, Bonap.—*Trilatitius*, Gray (in part).

Top of the head much elevated; face very short, concave in its longitudinal direction; muzzle obtuse, not much depressed, nostrils near together, with their upper and inner margins slightly projecting, the space between these projecting parts being slightly emarginate. This notch between the nostrils does not, however, pass downward through the upper lip, which is entire and rather prominent. The nostrils themselves are crescent-shaped and open sublaterally. From the outer side of each is a vertical notch or groove passing through the lip, but leaving its central portion entire and slightly projecting*. Lateral parts of the lip thick and overhanging.

Lower lip with a distinct and clearly defined reflex central portion, as in *Natalus*, but of much less extent.

Ears angular-round, very short; tragus short, of uniform breadth, round at the end, and curved inwards. Tail as long as the head and body. Wing-membranes extending to the *extremity of the tibiae*. Os calcis short. Cutaneous system ample; *middle phalange of the second and third finger very short*. Fur very thick and soft.

Skull with the bony palate extending backwards as far as the molar series only. Intermaxillary bones nearly meeting in front, so as to allow space for a considerable interval on each side between the outer incisors and the canines, and leaving only a small interspace between the two inner incisors. Incisors placed across the opening between the canines.

1. **MINIOPTERIS SCHREIBERSII.**

Vespertilio Schreibersii, Natt. in Kuhl, Wetter. Ann. iv. 41, 1817; Desm. Mamm. p. 138, 1820; Fisch. Synop. Mamm. p. 104, 1829; Temm. Mon. Mamm. ii. p. 174, 1835–41; De Selys-Longch. Etude Micro-mamm. p. 138, 1839; Wagn. Supp. Schreib. Saugth. i. 508, 1841.

Miniopterus Schreibersii, Keys. et Blas. Wiegmann. Arch. v. 323, 1839; Die Wirbelthiere Europ. p. xiii. et 44, 1840; Less. Nouv. Tab. Règne Anim. p. 27, 1842.

Miniopterus Ursinii, Bonap. Faun. Ital. fasc. 21. fol. 106, 1832–42; Gray, Mag. Zool. Bot. ii. 497, 1838; De Selys-Longch. Etude Micro-mamm. p. 139, 1839; Less. Nouv. Tab. Règne Anim. p. 27, 1842.

Vespertilio Ursinii, Temm. Mon. Mamm. ii. p. 179, 1835–1841.

Vespertilio dasythrix, Temm. Mon. Mamm. ii. p. 268.

* This projecting part of the upper lip is somewhat singular. Separated by the two vertical grooves above mentioned, it is well and clearly defined, and has somewhat the appearance of the cartilaginous forepart of the palate of some Ruminants, as that of the Sheep. Its surface is conspicuously granular, and in size it exactly corresponds with the naked reflex portion of the lower lip, so that when the mouth is closed the two parts fit closely together.

Vespertilio Natalensis, Smith, South African Quart. Journ. new ser. v. 1, 1832.

Miniopterus dasythrix, Smith, Ill. Zool. S. Africa, no. 27. pl. 52, 1848; Schinz, Synop. Mamm. i. p. 166, 1844.

The crown of the head is very much elevated, and the face so much depressed as to give the appearance of a deep hollow across its middle. The muzzle is very short and round, but it is not itself much depressed, as in the flat-headed species such as the *Noctule*. From the great concavity of the middle part of the face, the muzzle appears to have an upward direction. The nostrils are small, near together, and in the specimens preserved in spirit are directed nearly straight forward; but in dried specimens they have a sublateral direction.

The ears are very short, somewhat quadrangular in form, with the angles rounded, and have their outer margin brought forward along the face in the form of a very narrow strip of membrane to near the corners of the mouth. The inner margin rises from the side of the head in a perpendicular direction for a very short distance, and then making an angle, which if not rounded off would be a right angle, proceeds outwards in nearly a straight line, and forms another similar rounded angle with the outer margin. About the middle of the outer margin is a slight hollow.

The tragus reaches fully halfway up the ear, and in actual measurement nearly equals it in length, both being viewed as simple projections and measured along their central lines. Its form is somewhat similar to that of the tragus of the common *Pipistrelle*; but it is relatively longer and narrower, of absolutely uniform breadth, and with the tip more regularly rounded. It curves inwards for the whole of its length, but most strikingly so about one-fourth of the distance from the end.

The wings are long in relation to the size of the animal, and the longest finger is fully twice the length of the fore-arm. The middle phalanges of the two longest fingers in the wing are very short, but the relative lengths of the same parts in the other fingers are not remarkable. In the relative proportions of these bones to each other, they closely resemble the same parts in *Furipterus*, but in no other group that I have had the opportunity of examining. Thumb of medium length and size, with the terminal phalange a little longer than the basal one; its claw rather strongly hooked.

The wing-membranes are attached as far as to the extremity of the tibiæ.

The hinder limbs are of medium proportion; but the feet are rather large, and have the toes of about one-half of their entire length. The claws, although of moderate size, are strongly hooked.

The tail is long, and is composed of nine vertebrae, and is fully equal in length to the head and body. It is wholly enclosed by the interfemoral membrane, which has about thirteen transverse dotted lines, which are very near together on its basal portion. All the membranes are somewhat diaphanous, but present no great peculiarities of reticulated or other markings.

The fur is soft and thick, of medium length, and rather faintly bicoloured, both above and below. That of the upper parts is dark brownish grey at the base, its terminal half paler and strongly tinged with brown. Beneath it has similarly coloured roots, with palish grey-brown tips. Such is the colour of the European examples. Those from Algeria are characterized by a strong ashy tinge over the whole of the fur, and in some specimens the pubal region is wholly ash-coloured. Examples from Lake Ngama have all the upper parts of the body of a deep brownish grey (similar in colour to the roots of the hair in the European specimens), with the extreme tips of the hairs slightly paler, but not browner. Beneath, the fur is nearly black at its base, and tipped with ash colour; and the latter colour prevails around the region of the pubes. The specimens from this locality represent the *Vesp. dasythrix* of M. Temminck, and correspond pretty accurately with his description; but specimens from the Cape are described by Dr. A. Smith as having the upper parts "intermediate between chestnut-brown and yellowish brown," and the under parts "dull pale brownish red, tinged with wood-brown and yellowish brown, in places strongly tinted with pale reddish orange." I have seen no African example of this colour.

The cerebral region of the skull is very much elevated, almost as much so as in *Furipterus*, the evenness of its convexity being interfered with only by a narrow transverse depression occupying the position of the suture uniting the occipital with the parietal bones, by a moderately developed sagittal ridge, most conspicuous on the frontal region, and by an occipital crest of similar degree of development.

The facial part of the cranium is very much depressed, and it is also considerably compressed. The intermaxillary bones are, as in *Furipterus*, more developed than is usually the case among the *Vespertilionidæ*, affording sufficient space for the incisors to be inserted in a nearly perpendicular position, and at the same time to leave a considerable interval between them and the canines. It is worthy of remark, that in this, as in the crania of the other species of the genus, the antorbital foramina are placed more forward than usual, only just behind the canines. The nasal opening is rather small, and the corresponding notch in the front of the palate proportional to it in size. The orbit is small, and the zygomatic arches have a very moderate lateral curvature. As in other species having a dome-shaped cranium, the condyloid fossæ are in a line high above that of the teeth, and the zygoma in consequence starts at an angle from the line of the dental series and passes upwards and backwards to the condyle. In those species which, like the common *Noctule*, have a flat cranium, with both the facial and cerebral surfaces in one continuous line, the dental series and the zygoma are in nearly a continuous line also.

The bony palate presents one peculiarity, viz. that it scarcely extends posteriorly beyond the last molar, whereas in the generality of the *Vespertilionidæ* it reaches as far backwards as halfway be-

tween the last molar and the condyles, and in some instances reaches even so far back as to the latter.

The lower jaw does not present any great peculiarities of structure. It has a rounded *posterior angle*, to adapt itself to the elevated position of the cranial condyles, and a distinct and well-marked *posterior process*, about halfway between the *angle* and the *condyloid process*. The *coronoid process* is of ordinary form and on a level with the *condyle*.

Viewed in front, the upper incisors are seen to be in two pairs, which are separated by a moderately wide opening in the centre, and by another of less extent on each side, between them and the canines; but the teeth in each of these pairs are placed close together. In direction, their tips point a little inwards. Seen laterally they are nearly vertical.

In form they present no remarkable deviation from what is common in the genera *Vespertilio* and *Scotophilus*: they are of nearly equal length, the two nearest the canines simple in form and somewhat blunt, the inner ones more pointed and with a kind of basal cusp or point near to the outer ones. The canines are of medium size, and conical, with but little angularity, and possessed of a moderately developed *cingulum*. The first pre-molar is small, and has a central pointed cusp, surrounded by a flattish space, from the centre of which it projects. Its general appearance is that of a diminutive canine having an exceedingly broad *cingulum*. Succeeding to this, and contiguous to the first true molar, is a tooth which may be regarded as taking the place of the sectorial tooth of the Carnivora; it is rather long and pointed, with an inner basal ring, which is considerably developed in the direction of the palate.

The true molars have nothing remarkable either in number or form.

In the lower jaw the incisors exhibit a slight deviation from the usual type. The four central ones are small and trilobed; but the two outer ones are conspicuously larger, and instead of having a thin lobated edge, have a roundish flattened crown with a transverse cleft through its centre, for the reception of the point of the outer upper incisor when the jaws are closed.

The lower canines are of the ordinary form; but it is worthy of remark, that the basal ring or collar is considerably developed, running off into a flat basal space in the direction of the first pre-molar, but rising up into a kind of blunt accessory cusp near to the large incisor already mentioned.

This form of canine cannot, however, be instanced as peculiar to the genus, since I find that the additional cusp occurs more conspicuously in some other species, as the common *Noctule Bat*, and the equally common *Long-eared Bat*; whilst in some others, as the *Kerivoula picta* and the *Barbastelle*, it appears as a mere ring of enamel around the base of the tooth.

The three following teeth are of a very simple form, conical and pointed, surrounded by a *cingulum* which is rather more developed

on the inside of the teeth than on the outer. They increase in size evenly and rapidly, so that the one contiguous to the molars is the highest tooth in the jaw, excepting the canine, and even to that it is not greatly inferior.

The only peculiarity I am able to note respecting the true molars is, that the first has its anterior inner cusp so much produced as to be nearly even with the outer anterior one, usually much the highest.

The numeration of the teeth may be thus stated:—

In. $\frac{2-2}{6}$; Can. $\frac{1-1}{1-1}$; Prem. $\frac{2-2}{3-3}$; Mol. $\frac{2-3}{3-3} = \frac{16}{20}$.

The dimensions in column 1 of the following table are those of a specimen from Bannatt; 2, those of one from Sicily: both preserved in spirit. Column 3 contains the dimensions of the mutilated skeleton, which is all that remains of the type of Prince Bonaparte's *Miniopterus Ursinii*; whilst column 4 refers to a specimen collected in Algeria in 1856 by the Rev. H. B. Tristram, and very kindly presented to me; and columns 5 and 6 refer to specimens from Lake Ngama, collected by Mr. Anderson. The three last-mentioned specimens are all preserved in skin, and their dimensions are therefore less to be depended on than those of the specimens in spirit.

	1.		2.		3.		4.		5.		6.	
	in.	lin.	in.	lin.	in.	lin.	in.	lin.	in.	lin.	in.	lin.
Length of the head and body...	2	3	2	3	.....	.....	2	9	2	4	2	3
— of the tail	2	3	2	1	1	10	2	0	.....	.....	.....	.....
— of the head	0	8½	0	8½	.....	.....	0	8½	0	8½	0	8
— of the ears	0	3	0	3	.....	.....	0	3	0	3½	0	3
— of the tragus	0	2	0	2½	.....	.....	0	2	0	2	0	2½
— of the fore-arm	1	9	1	9	1	8½	1	8½	1	9	1	8½
— of the longest finger ...	3	6	3	5	3	3	3	4	3	5	3	3
— of the fourth finger ...	2	2	2	0	2	0	2	1	2	2	2	0
— of the thumb	0	4	0	3	0	3½	0	3½	0	3½	0	3½
— of the tibia	0	9	0	8½	0	7½	0	8½	0	8½	0	8½
— of the foot and claws...	0	5½	5	0	0	4½	0	5	0	4½	0	4½
Expanse of wings	14	0	13	0	13	6	12	9	13	0	12	6

2. M. BLEPOTIS.

Vesp. blepotis, Temm. Mon. ii. p. 212, 1835–41; Müller, Over. Zoog. d. Ind. Archiv, p. 23, and table; Schinz, Synop. Mamm. i. p. 172, 1845.

Miniopterus blepotis, Blasius, Weigm. Arch. Bd. 6. p. 4, 1840.

Pipistrellus blepotis, Less. Nouv. Tab. Règn. Anim. p. 30, 1842.

Trilatitius blepotis, Gray, Ann. & Mag. N. H. v. 10. p. 258, 1842; Cat. Mam. Brit. Mus. p. 26, 1843; Zool. Voy. Samar. p. 8, 1849.

Scotophilus Morio, Gray, App. Greg's Narrat. p. 405, 1841; Cat. Mam. Brit. Mus. p. 29, 1843; Weigm. Arch. Bd. 8. p. 339, 1842; Schinz, Synop. Mamm. i. p. 192, 1844.

Vesp. Escholtzii, Waterh. Proc. Zool. Soc. 1845, p. 4.

Noctulinia ? *Escholtzii*, Gray, Zool. Voy. Samar. p. 9, 1849.

The following comparison of this species with the last has been made between a great number of examples of both, most of those of *M. blepotis* being preserved skins, whilst the greater part of those

of *M. Schreibersii* have been preserved in spirit. It is necessary to make this statement before proceeding further, as the foregoing description of the latter species was drawn up from the specimen in spirit, whereas the stuffed specimens of both species have been resorted to in the following comparative description. Unfortunately I have not yet obtained a sufficient number of *M. blepotis* in spirit to be able to give as many details as I could desire.

Compared with *M. Schreibersii*, the face of the present species appears more elongated, although still very short; and it is rather more pointed, and has the nostrils more prominent. The ears, too, are relatively somewhat longer.

In quality the fur is pretty similar, from whatever locality the animal may have been obtained. That of the upper parts is unicoloured, sometimes having the tips of the hairs a little paler. In *M. Schreibersii* it is bicoloured. The general colour is very dark brown, varying slightly in its hue according to the locality from which the examples have been obtained. Beneath it is bicoloured in both species. In the present one it is dark brown at the base, tipped with a paler tint of the same colour, which latter occupies the whole length of the hairs on the pubal region.

Examples from Japan have for the most part a rich umber tinge in the colour of the fur; in others from Amboyna a black-brown is the prevailing colour, still however with a reddish tinge, whilst the majority of those from Australia have the fur of a very deep brown colour without such tinge. There is, however, a remarkable variety sometimes met with in the latter country, which may be thus mentioned:—The fur of the head and fore part of the back is of the ordinary sombre colour, but that of the loins and rump is on the contrary of a bright chestnut-brown, very silky and shining, and the change from one colour to the other is not effected by a regular gradation, but takes place almost abruptly, a wavy irregular line across the loins marking the confines of the two. But in one or two specimens which I have seen, the chestnut colour extends up the middle of the back in a narrowish line, almost to the shoulders, and produces a very marked and beautiful variety*. In these specimens the region of the pubes also is lighter in colour than in the ordinarily coloured individuals.

I have not been able to examine examples of this species taken at different periods of the year, so as to follow out the notes given by M. Temminck of the seasonal changes in the colour of the fur.

Some differences are observable in the crania of this and the last

* Somewhat the same style of colouring occurs in the *Scotophilus Gouldii*, also of Australia, and in some examples there is a slight tendency towards the same peculiar division of the two colours. *Scotophilus tuberculatus* also, of New Zealand, is very similarly coloured; but the gradation from the dark fore parts to the more rufous hinder parts, is very slight and uniform.

Mr. Blyth has remarked of many of the Indian Bats, that they are subject to what he calls a *rufous phase*: perhaps this remark may be extended to the Australian examples of the present species, although why this should not equally take place with those inhabiting the islands of the Indian Archipelago, is rather difficult to decide.

species, which deserve mention. From the greater length of the muzzle, as already noticed, it might be expected that the cranium also would exhibit some corresponding elongation of its anterior part, and accordingly that is seen to be the case. On comparing the two skulls, that of *M. Schreibersii*, besides being altogether the smaller one, has the facial portion more compressed immediately in front of the orbits, and is less depressed. The posterior part of the palate also is narrower, so that the zygomatic arches spring at once *outwards* from the maxillary bones; whilst in *blepotis*, where this part of the skull is relatively broader, the zygoma passes off in a *backward* direction, scarcely making an angle with the outer surface of the maxillary bones.

Another very apparent difference consists in the much greater length and substance of the teeth, especially the canines in *M. blepotis*. In this species the upper canines are so long as to pass, when the jaws are closed, almost to the lower margins of the lower jaw, whilst in *M. Schreibersii* their points reach only to about the middle of the ramus. It is also deserving of notice, that the singularly formed outer incisors of the lower jaw exhibit the peculiarity already alluded to in a much greater degree in this species than in *M. Schreibersii*, or indeed than in any other species appertaining to the genus.

Columns 1, 2 and 3 in the following table of dimensions refer to specimens from Japan, 4 and 5 to specimens from Amboyna, and 6 to the specimen in the collection of the British Museum, from which Mr. Waterhouse took his description of *V. Escholtzii*.

	1.		2.		3.		4.		5.		6.	
	in.	lin.	in.	lin.	in.	lin.	in.	lin.	in.	lin.	in.	lin.
Length of the head and body...	2	6	2	9	2	6	2	5	2	6	2	1
— of the tail	2	0	2	2	2	2	1	9	1	9	2	1
— of the head.....	0	8	0	9	0	9	0	8	0	9	0	8½
— of the ears	0	3	0	3	0	3½	0	3	0	3	0	3
— of the tragus	0	2	0	2½	0	2½	0	2½	0	2½	0	2½
— of the fore-arm	1	9	1	9	1	9	1	8	1	10	1	9½
— of the longest finger ...	3	6	3	6	3	7	3	3	3	8	3	7
— of the fourth finger ...	2	0	2	1	2	2	2	0	2	2	2	4
— of the thumb	0	4	0	4	0	4	0	3½	0	3½	0	3½
— of the tibia	0	9	0	8½	0	9	0	8	0	9	0	8½
— of the foot and claws ...	0	4	0	4½	0	4½	0	4	0	4½	0	4
Expanse of wings.....	14	0	14	0	14	0	12	6	14	0	13	6

The specimens, the dimensions of which are given in the next table, formed part of Mr. Gould's Australian collection, and were obtained at several localities. They have been selected from a considerable number as fair representatives of the so-called *Scotophilus Morio*.

	1.		2.		3.	
	in.	lin.	in.	lin.	in.	lin.
Length of the head and body ..	2	8	2	9	2	8½
— of the tail	2	2	1	9	2	3
— of the head	0	9	0	9	0	8½

	1.		2.		3.	
	in.	lin.	in.	lin.	in.	lin.
Length of the ears	0	3½	0	3½	0	3½
— of the tragus	0	2½	0	2½	0	2½
— of the fore-arm	1	10	1	9½	1	9
— of the longest finger . .	3	6	3	6	3	6
— of the fourth finger . . .	2	2	2	3	2	1
— of the thumb	0	3½	0	4	0	4
— of the tibia	0	9	0	9	0	8½
— of the foot and claws . .	0	5	0	5	0	4½
Expanse of wings	13	10	14	0	13	6

3. *M. TRISTIS.*

Vespertilio tristis, Waterhouse, Proc. Zool. Soc. pt. xiii. p. 3, 1845; Gray, Zool. Voy. Samar. p. 31, 1849.

The muzzle of this species is relatively broader and more obtuse than in any other species of the genus; and this peculiarity, together with its superior size, is sufficient at once to distinguish it from the last species, which it otherwise resembles. The peculiarity pointed out by Mr. Waterhouse of having the nostrils directed sublaterally, whilst in the allied species *M. blepotis* they open almost in front, does not, I think, furnish a very valuable character in any of the species which have the glands of the upper lips much developed. When these glands are large, they often advance so far forward as to thrust the outer margins of the nostrils forward also, or at any rate to close up the vertical notch already mentioned as separating the lips from the nostrils. This gives the latter the appearance of opening directly in front; whereas the same species, when examined in a dry state, when the lips have shrunk and produced a more pointed muzzle and prominent nostrils, the latter are found to open more or less laterally. And as it is not uncommon to meet with different individuals of the same species (in this genus) having these glands developed in a slightly different degree, so it is common to observe a corresponding difference in the nostrils. A good number of examples will alone supply the necessary materials by which to distinguish truthfully the characters of allied species. It remains therefore, as I think, to be proved by the examination of a greater number of examples, that this species differs essentially in what may be called a generic peculiarity from the so-called *Vesp. Escholtzii*, or that the latter differs from the *Vesp. blepotis* of M. Temminck.

I can detect no difference in the distribution or quality of the fur from the species last described. It is unicoloured, and the general colour is very deep brown, as in the Australian specimens of *M. blepotis*. When seen in spirit, it appears to be sooty black.

As far as is at present known, this species is confined to the Philippine Islands.

	in.	lin.
Length of the head and body	2	6
——— of the tail	2	5
——— of the head	0	10½
——— of the ears	0	4
——— of the tragus	0	2¾
——— of the fore-arm	2	1
——— of the longest finger	4	3
——— of the fourth finger	2	5
——— of the thumb	0	3½
——— of the tibia	0	10
——— of the foot and claws	0	5½
Expanse of wings	15	6 or 16 in.*

4. *M. AUSTRALIS*, n. s.

This species differs from *M. blepotis* in having the face more hairy, the ears relatively smaller, and the thumb much smaller, and in being itself much smaller. The fur too of the under parts encroaches somewhat on the membranes, whilst in *M. blepotis* they are quite free from fur.

M. Temminck, speaking of the latter species, says, "La femelle n'a guère plus de 3 pouces 4 lignes (of length); envergure à-peu-près 10 pouces; antibrachium 1 pouce 6 lignes;" which statement of dimensions appears to apply with moderate accuracy to the present species. It is not, however, the female of *M. blepotis*, as I have examined specimens of both sexes, adult and immature; and if neither age nor sex will explain the great difference in size, it must be regarded as a very remarkable variety or as a distinct species. The fact of its occurrence over a very considerable range of country—the Indian islands and Australia—inhabiting alike island and continent without manifesting any difference in appearance, is very strong evidence against its being a mere variety, and in my opinion fully establishes it as a distinct species.

The general colour of the fur is very similar to that of *M. blepotis*; but the generality of specimens have a more decided rufous tinge, which is given by the tips of the hairs being paler and redder than at the base. But this is not perceivable in some individuals, and thus they are of the ordinary sombre colour of the Australian examples of *M. blepotis*.

In the following Table of Dimensions, columns 1 and 2 refer to

* It will be observed, that the dimensions I have given differ a little from those given by Mr. Waterhouse, both taken from the same specimen. But the difference is very trifling in all respects save in the expanse of the wings, and here a good deal depends upon the measurer. I have usually taken this dimension by means of a thread extended along the bones of the wings to the shoulders, and then taken the breadth between them with a pair of compasses.

If the expanse be taken in a straight line between the tips of the open wings, it must be evident that the length of this line will depend on their complete or partial expansion, and in dried specimens it is almost impossible to have them all with the wings in an exactly similar position. It is on this account that I have adopted the method just stated.

adult males, 3 to an adult female in young, 4 to a youngish male with the wing-joints imperfectly ossified, all of them being preserved in spirit in the British Museum; and column 5 to a specimen in skin in the same collection,—the whole of them having been collected in Australia by Sir G. Grey, K.C.B., and presented to the National Collection. The dimensions in column 6 have been taken from the specimen of *M. blepotis* mentioned in Dr. Gray's 'Catalogue of the Mammalia of the British Museum,' as having been received from the Leyden Museum, its country being Timor. It is probable, therefore, that this may have been mistaken by M. Temminck for the female of that species. Be this as it may, the specimen in question is certainly a *male*, and the perfectly ossified condition of the wing-joints indicates that it is *adult*.

	1.		2.		3.		4.		5.		6.	
	in.	lin.	in.	lin.	in.	lin.	in.	lin.	in.	lin.	in.	lin.
Length of the head and body...	1	11	1	9	1	8	1	8	1	7	2	0
— of the tail	1	9	1	8	1	8	1	6	1	5	1	5
— of the head	0	8	0	7½	0	7½	0	7½	0	7½	0	7
— of the ears	0	3	.....	.....	0	3½	0	3½	0	3	0	3
— of the tragus	0	2½	.....	.....	0	2	0	2½	0	2	0	2
— of the fore-arm	1	7	1	6½	1	5	1	6	1	5½	1	5
— of the longest finger ...	3	0	.....	.....	2	8	2	8	2	9	2	8
— of the fourth finger ...	1	10	.....	.....	1	8	1	8	1	8	1	8
— of the tibia	0	7	.....	.....	0	7	0	7	0	6	0	6½
— of the foot and claws...	0	4½	.....	.....	0	3½	0	3½	0	4	0	3½
Expanse of wings	11	8	11	0	10	6	10	7	11	0	10	6

The name under which I have described this species was given under the impression that it was exclusively a native of Australia. It was not until after I had arranged and named the specimens in the British Museum and in some other collections, that I found it to be an inhabitant of Timor (and probably other islands of the Indian Archipelago) as well as of Australia, and that the name of *australis* was not strictly appropriate. But to avoid the confusion which might possibly arise from a change of name, I have thought it desirable that it should remain unaltered.

The two species following I am unable to give as complete an account of as I could wish.

The first is exhibited in the Leyden Museum with the name of *Vesp. tibialis* affixed, but I am not aware that any description has appeared. In that collection are four specimens, all from Amboyna. A single specimen in my own collection, received also from Amboyna by MM. Verreaux, although in a somewhat mutilated condition, will nevertheless furnish a sufficiently complete description by which to recognize the species, if species it really is.

In general appearance it closely resembles *M. blepotis*, but is a trifle smaller, and moreover appears to differ remarkably in all the specimens, in having the extremity of the tibia perfectly free for nearly a third of its length. The wing-membranes do not extend beyond two-thirds of the length of the tibia, and the *os calcis* ad-

heres closely to it up to the same point, and then starts from it at nearly a right angle, so that the extremity of the limb is completely unencumbered, and appears like a slender shank.

If this peculiarity is persistent, and not due to the state of preservation, it would mark out a very distinct and good species; but it is very desirable that other specimens be examined that have been preserved in spirit, in which state they show these parts in a more natural condition. It is worthy of note, however, that all the specimens present precisely the same appearance; that is, the leg is free for the same length, and this would hardly be the case were it due to the state of the preservation merely. On the other hand, the species so closely resembles in all other respects the *M. blepotis*, that one may well hesitate and view with suspicion a species having only a single point of difference.

The following are the dimensions of the specimen in my own collection:—

	in.	lin.
Length of the head and body, about	2	6
—— of the head	0	7
—— of the ears	0	3½
—— of the tragus	0	2
—— of the fore-arm	1	6½ or 7 lin.
—— of the longest finger	2	11
—— of the fourth finger	1	8
—— of the tibia	0	7
—— of the tibia, free part	0	7
—— of the foot and claws	0	3½
Expanse of wings	11	6

The other species to which I have alluded bears considerable resemblance to the one I have called *M. australis*. A single specimen in the British Museum, received from the Stockholm Museum with the name of *Vesp. scotinus* affixed, furnishes all the information I possess respecting it, excepting that it is also labelled "Port Natal." I am not aware that any description has been published.

The fur of the upper parts is fuliginous-brown, with the tips a little paler and greyer in hue. Beneath similar, but with the tips of the fur paler, especially about the pubes. The general colour more nearly resembles the darker examples of *M. Schreibersii*, which have been described as *V. dasythrix*, than any other species; and possibly it may prove to be a small example of that species.

The examination of a single specimen does not, amongst allied species, afford sufficient evidence for a satisfactory decision; and I prefer therefore to leave undecided the claims of the present so-called species, until further information afford more ample means of deciding.

The following are the dimensions:—

	in.	lin.
Length of the head and body, about	1	10
—— of the head	0	7

	in.	lin.
Length of the ears.	0	3
— of the tragus.	0	2
— of the fore-arm.	1	6
— of the longest finger.	2	4
— of the fourth finger.	1	11, nearly.
— of the thumb.	0	3 ³ / ₄
— of the tibia.	0	8 ¹ / ₂
— of the foot and claws.	0	5
Expanse of wings, about.	12	6

The plate which accompanies the present memoir illustrates some of the peculiarities of the genus of which I have given a description.

2. ON SOME NEW OR LITTLE-KNOWN SPECIES OF ACCIPITRES,
IN THE COLLECTION OF THE NORWICH MUSEUM. BY
PHILIP LUTLEY SCLATER, M.A.

At the request of Mr. J. H. Gurney, I exhibit to the meeting some interesting birds belonging to the fine series of specimens of the order Accipitres, which that gentleman has collected for the Norwich Museum. Among them appear to be several new or little-known species, concerning which I beg to offer the following remarks:—

1. URUBITINGA SCHISTACEA.

Asturina schistacea, Sund. Ofv. Af. K. Vet. Ak. Förh. 1849, p. 132.

Falco ardesiacus, Licht. in Mus. Berol.

Morphnus schistaceus, Sclater, P. Z. S. 1857, p. 261.

♂ *adultus*. *Totus nigro-cinereus, cauda nigra, fascia media angusta margineque apicali albis: orbitis subnudis: rostri apice nigra, hujus basi cum pedibus flavis.*

Long. tota 16·0, alæ 11·0, caudæ 7·0, rostri a rectu 1·4, tarsi 3·3.

Sundeval has given an excellent description of this bird, which does not appear to have been recognized by any other writers except Prince Bonaparte. By this author it is alluded to in an article entitled "Revue générale de la classe des Oiseaux," in the 'Revue et Mag. de Zool.' for 1850, p. 474, and again in the 'Comptes Rendus' for 1855, under the specific name *ardesiaceus*, the synonym "*Falco ardesiacus*, Licht. in Mus. Berol." being said to refer to it.

Of the two examples of this species belonging to the Norwich Museum, one was procured by Mr. H. W. Bates* on the Rio Javarri—a branch of the Upper Amazon; and the other, I have no doubt, from the ticket with which it is labelled, is from the interior of Bolivia. So we may conclude that the interior wood-region of Peru and Bolivia is the natural *habitat* of this species.

* See P. Z. S. 1857, p. 261.

There are at least three birds of this group which are in their adult plumage slaty-black or blackish, with a white bar across the tail. The first of these and largest in size is the *Falco urubitinga* of the older authors. Lesson in 1839 proposed to convert the term *Urubitinga* into a generic name, and it was so adopted by Lafresnaye in 1842, before the creation of Cabanis's genus *Hypomorphnus* for the same type. See M. de Lafresnaye's remarks on this subject in the 'Revue Zoologique' for 1848, p. 240. With regard to the specific name to be employed for this bird we cannot use Brisson's "*brasiliensis*," as is done in Strickland's 'Ornithological Synonyms,' because Brisson's* names are not to be employed in a binominal system of nomenclature. Nor is it proper to adopt Illiger's MS. term "*longipes*," as proposed in Prince Bonaparte's 'Conspectus,' while there are many other names for this bird already published. So the earliest specific name available seems to be Shaw's *zonurus* (*Falco zonurus*, Shaw's Zool. vii. p. 62), and this species should stand as *Urubitinga zonura*. It appears to have an extensive range, extending from Paraguay, all over Bolivia, Peru, Brazil, Guiana and New Granada into Southern Mexico, where specimens were obtained by M. Sallé (see P. Z. S. 1857, p. 227).

The second allied species of *Urubitinga* is the "*Falco anthracinus*, Licht. in Mus. Berol.," under which name it is described by Nitzsch in a note to his 'Pterylographie' (p. 83). This is the same as Du Bus's *Morphnus mexicanus* (Bull. Ac. Brux. 1847). See M. de Lafresnaye's observations in the 'Revue Zoologique' for 1848 (p. 240), where he clearly points out the differences between this bird and the *Urubitinga zonura*. The *Urubitinga anthracina* inhabits the northern portion of South America, Guiana† and New Granada‡, Guatemala and Southern Mexico§, where MM. Botteri and Sallé both procured it, and M. Du Bus's types were collected. The third species is *Urubitinga schistacea* as characterized above, which is distinguishable at once from the preceding by its inferior size and narrower tail-band. The following diagnoses are sufficient to point out the differences between these three species || :—

1. *U. zonura*. Major, caudæ dimidio basali et margine apicali albis.
2. *U. anthracina*. Media, caudæ fascia lata et margine apicali albis.
3. *U. schistacea*. Minor, caudæ fascia angusta et margine apicali albis.

Such are these birds in their adult plumage : in their immaturity they are quite different. I have not yet seen the young of *U. schi-*

* See British Association's Report on Zoological Nomenclature, rule 2, p. 5.

† Schomburgk, Reisen in Britisch Guiana, iii. p. 740.

‡ MM. Verreaux have received examples from Santa Martha.

§ See P. Z. S. 1857, pp. 211 & 227.

|| A fourth black *Urubitinga*, allied to *U. anthracina*, has lately been described by Cabanis from Cuba under the name *Hypomorphnus Gundlachii*. See Cab. Journ. f. Orn. 1854, Erinnerungs-heft, p. lxxx.

stacea, as I now think the specimen in one of Sallé's Mexican collections called *Morphnus schistaceus*, juv. (P. Z. S. 1857, p. 227) does not really belong here; but the other two species in their immature state are both irregularly flammulated on the lower surface and back, and have numerous buffy-white cross-bars on the tail and under tail-coverts. Specimens of *U. zonura* in this state are in the British Museum, and we have a fine example of a similar bird now alive in our Gardens.

I have hitherto used for these birds the generic term *Morphnus*, following Mr. Gray and other writers; but on considering that the true type of *Morphnus* is the *Falco guianensis* of Daudin—a bird of different structure and more nearly allied to *Thrasaëtus*—I think they stand better disconnected. But the *Falco uncinatus* of Temminck and *Falco meridionalis* of Latham—two allied species—for which Kaup's term *Spizigeranus* may be employed subgenerically—ought, as M. de Lafresnaye* has observed, to come close to the true *Urubitingæ*; and *Buteogallus* with its two species (*æquinoctialis* and *nigricollis*) follows next. A bird more closely corresponding to the *Urubitingæ* in its changes of colouring is *Urubitornis solitaria*, of which M. Jules Verreaux has described the several stages of plumage in these 'Proceedings†'; but it is distinguishable by its shorter and much more robust tarsi.

2. BUTEO ZONOCERCUS, sp. nov.

Schistacescenti-niger unicolor, alis extus brunnescente tinctis: remigum pogoniis interioribus albo obsolete transfasciatis: cauda nigra; vitta inferiore lata, et alteris duabus superioribus angustioribus et imperfectis cum margine apicali albis: rostro nigro, cera aurantia, pedibus flavis.

Long. tota 17·0, alæ 14·7, caudæ 7·5, rostri a rectu 1·3, tarsi 2·9.

Hab. Guatemala.

In plumage this bird is very much like the typical *Urubitingæ*, being of a nearly uniform ashy-black, tinged with brown on the scapularies and secondaries, and with a broad white band across the tail. Above this are two other bands, much narrower and not quite complete, and the tail is likewise tipped with white. The colour of these bands is pure white on the under surface; on the upper surface it is cinereous on the outer webs of the lateral rectrices, and on both webs of the medial pair, but pure white on the inner webs of the lateral tail-feathers. The lowest band is about $1\frac{1}{2}$ inch in breadth, the second not half an inch, and the highest is quite narrow. There are distinct traces of white cross-bands on the inner webs of the wing-feathers. The wings are, however, much more elongated than in the *Urubitingæ*, the third primary (which is longest) extending 4 inches beyond the secondaries. The fourth and fifth primaries are only slightly shorter than the third, the first being nearly of the same length as the longest secondary. The general form seems to be that of the *Buteones* appertaining to the

* Rev. Zool. 1848, p. 240.

† See P. Z. S. 1856, p. 145.

subgenus called *Tachytriorchis*, and the nearest ally of the present species among the specimens of the British Museum appears, as has been pointed out to me by Mr. G. R. Gray, to be his *Buteo albonotatus* (Cat. Accipitres [1848], p. 36). This latter bird does not appear to me to differ from Cabanis's *Buteo abbreviatus*, described in Schomburgk's 'Reisen in Britisch Guiana,' vol. iii. p. 739, and I should be inclined to consider the two names as synonymous.

3. *SYRNIUM ALBITARSE*, sp. nov.

Syrnium albotarse, G. R. Gray in Mus. Brit.

Supra brunneascenti-nigrum, plumis omnibus pallido rufo semel aut pluries late transfasciatis; pileo unicolore nigricante, plumis subtus pallide rufis: alis caudaque nigricantibus; remigum pogoniis exterioribus quinque sive sex maculis quadratis pallide rufis marginatis; rectricibus vittis quinque et altera terminali latiore supra pallide rufis, subtus magis albidis apparentibus transfasciatis: facie, loris, mento et plumis supra-ocularibus albis: subtus pure album, rufescente mixtum, plumarum terminationibus latis interdum etiam scapis saturate brunneis; tibiis et tarsorum parte superiore rufis, horum parte inferiore albis: rostri plumbei apice flava, pedibus fuscis.

Long. tota 15·0, alæ 11·0, caudæ 6·5, tarsi 1·9.

The name of this Owl was inserted in the list of specimens of *Accipitres* in the collection of the British Museum published in 1848; but no description of it has yet appeared. The type in the British Museum is immature, and nearly agrees with one in my own collection. Mr. Gurney's specimen, from which my description is taken, appears to be nearly adult. All these three examples were received in collections from Bogota, and they are the only individuals of this species that I have yet met with. The face of this bird is white; the head above brownish-black outside, with the bases of the feathers bright rufous. The whole upper surface is brownish-black varied with this rufous colouring, every feather being crossed with a broad subterminal band of rufous, sometimes with a second, and these bands being occasionally incomplete in the middle across the shaft. The primaries and secondaries are marked externally with rather square-shaped rufous spots, four or five in number. The tail has five cross-bands besides the terminal one formed in the same way, which bands appear whitish on the lower surface. Below, the colouring is creamy-white tinged with pale rufous, the breast-feathers, particularly on the sides, having broad terminations of black-brown, the belly-feathers narrower terminations and also lateral margins of the same colour. The tarsi are creamy-white with a yellowish tinge in both my specimens, more nearly pure white in that in the British Museum. They are thickly feathered down to the fissure of the toes. The form is that of other South American *Syrnia*, the fourth and fifth wing-feathers being equal and longest, only slightly exceeding the third. The specimen which I take for

the younger bird only differs in having the head varied like the back, and being generally more rufous.

The other American species of this genus of which I have seen specimens are :—

1. *Syrnium hylophilum* (Temm. Pl. Col. 373), from Brazil. Mus. Brit. et Acad. Philadelph.

2. *Syrnium rufipes* (King, Zool. Journ. iii. 426), from Tierra del Fuego. Mus. Brit. Perhaps the same as the Chilian species figured by Des Murs as *Ulula fasciata*, Icon. Orn. pl. 37.

3. *Syrnium virgatum*, Cass. (Journ. Ac. Phil. vol. ii.) (*S. squamulatum*, Bp.—*S. zonocercum*, G. R. Gray), from S. Mexico and Central America.

4. *Syrnium polygrammicum*, G. R. Gray in Mus. Brit. ex Brasil. An undescribed species very nearly allied to the last.

5. *Syrnium albigulare*, Cass. (Journ. Ac. Phil. vol. ii. pl. 4. p. 52).—*S. macabrum*, Bp.—*S. albipunctatum*, G. R. Gray in Mus. Brit. From Bogota.

4. *SCOPS USTA*, sp. nov.

Supra saturate castaneo-brunnea, plumis omnibus nigro subtilissime vermiculatis: facie et gula pure castaneo-brunneis, hac pallidior: linea post regionem auricularem, cornuum capitis extantum marginibus latis et pileo supero nigris: alarum pennis pallide castaneo-brunneis nigro punctulatis, intus autem ochraceo-albidis, quinque aut sex fasciis latis in pogonio externo, maculas quadratas efficientibus, nigris transvittatis; cauda ex eodem colore sed fasciis nigris pene obsoletis: subtus clarius brunnea, lineis angustis longitudinalibus, scapas plumarum occupantibus, nigris parce notata: tectricibus alarum inferioribus sordide albis: tarsis pallide fulvis: rostro et pedibus flavis.

Long. tota 8·5, alæ 7·0, caudæ 4·0, tarsi 1·2.

Hab. Ega on the Upper Amazon (H. W. Bates).

This species is founded on the *Scops* which I mentioned as occurring in Mr. Bates's collection from the Upper Amazon in these 'Proceedings' for last year (p. 261). It is distinguishable from every other South American member of the genus, as far as I am acquainted with them, by its rich brown colouring above and below, and by the longitudinal lines below not being crossed as in *Scops choliba* and *S. atricapilla*. I am inclined to refer the *Scops* which was contained in M. Verreaux's collection from the Rio Napo to this same species. It presents nearly the same appearance on its lower surface, but the colouring above is more like that of *Scops choliba*, and I think it is probably a young bird. The birds of this genus are difficult to distinguish, and I have been unable to identify the present examples with any of ten species which have been already described as inhabiting different parts of America, as follows :—

1. *Scops asio* (Linn.), Cassin, Birds of Californ. p. 179.
Hab. Whole of N. America, chiefly Atlantic States. Mus. Brit.
2. *Scops Maccalli*, Cassin, Birds of Californ. p. 180.
Hab. Texas and N. Mexico.
3. *Scops flammeola*, Kp.—*Strix flammeola*, Licht. in Mus. Berol.
Hab. Southern Mexico.
4. *Scops choliba*, Vieill.—*Strix crucigera et undulata*, Spix.
Hab. Cayenne, Brit. Guiana, Brazil, Eastern Peru, Bolivia and New Granada. Mus. Brit.
5. *Scops portoricensis*, Less. : Des Murs, Icon. Orn. pl. 26.
Hab. Puerto Rico and New Granada. Mus. Paris.
6. *Scops Watsoni*, Cassin, Pr. Ac. Sc. Phil. iv. p. 123, et Journ. Ac. Phil. ii. pl. 12. fig. 1. p. 95.
Hab. Venezuela and Surinam.
7. *Scops atricapilla* (Temm.), Pl. Col. 145.
Hab. Brazil. Mus. Brit.
8. *Scops lophotes*, Less. Tr. d'Orn. i. p. 107; Puch. Rev. et Mag. de Zool. 1849, p. 22.
Hab. Cayenne.
9. *Scops grammicus*, Gosse, B. Jam. p. 19, Illustr. pl. 4.
Hab. Jamaica. The type of Kaup's proposed genus *Pseudoscops*: see Bp. in Compt. Rend. Oct. 22, 1855. Mus. Brit.
10. *Scops nudipes*.—*Ephialtes nudipes*, Cassin, List of Strigidæ, sp. 13.—*Bubo nudipes*, Vieill. Ois. de l'Am. Sept. pl. 22.

This paper will be published in the 'Transactions' of the Society, and illustrated with plates.

3. DESCRIPTIONS OF NEW SPECIES OF LAND AND FRESHWATER SHELLS COLLECTED IN CEYLON, FROM THE COLLECTION OF H. CUMING, ESQ. BY H. DOHRN.

1. *HELIX ALBIZONATA*. *Testa subperforata, turbinato-depressa, solida, striis longitudinalibus et spiralibus distantioribus decussata, castanea; sutura alba; anfr. 6 viz convexi, lente accrescentes; ultimus carinatus, carina albizonata; subtus convexiusculus, longitudinaliter striatus, nitidus; apertura oblique lunaris, intus cærulescens; peristomium rectum, intus incrassatum, margine columellari superne dilatato, perforationem fere tegente.*

Diam. maj. 25, min. 22½, alt. 15½ mill.

Allied to *H. Gardeneri*, Pfr.

2. *LIMNÆA PINGUIS*. *Testa imperforata vel vix rimata, ovato-oblonga, pellucida, tenuis, nitidissima, longitudinaliter levissime striata, cornea vel albicans; sutura simplex, albida; spira elevata, apice acuto, rubicundo; anfr. 4-4½ convexiusculi, ultimus ¾ longitudinalinis subæquans; apertura obliqua, ovato-oblonga; peristomium rectum, simplex, margine columellari reflexo; marginibus callo tenui junctis.*
Long. 18, lat. $9\frac{1}{2}$; apert. long. $11\frac{3}{4}$, lat. $5\frac{1}{2}$.
3. *LIMNÆA TIGRINA*. *Testa oblonga vel ovato-oblonga, imperforata vel vix rimata, tenuis, pellucida, nitida, cornea, longitudinaliter irregulariter albofasciata, subtilissime spiraliter et longitudinaliter striata; sutura simplex, plerumque brunnea; spira acuta, apice fuscescente; anfr. 4-5 vix convexi, ultimus efflatus, ¾ longitudinalinis subæquans; apertura ovato-oblonga vel oblonga; peristomium simplex, rectum, margine columellari reflexo; marginibus callo albido, non nitido, junctis.*
Long. 25, lat. 13; apert. long. 16, lat. 8 mill.
- a. *Normalis.*
β. *Var. minor: cornea vel albida, interdum unicolor.*
Long. 19, lat. 10; ap. long. 14, lat. 7 mill.
4. *PLANORBIS STELZNERI*. *Testa discoidea, albido-cornea, tenuiter longitudinaliter striata, nitida, pellucida, supra plana, subtus paullo convexior, utrinque foveolata; anfr. 3-4 vix convexi, ultimus acute carinatus; apertura perobliqua, sub-lunaris; peristomium rectum, intus albolabiatum.*
Diam. maj. 7, min. $5\frac{1}{2}$ mill.; alt. apert. 1 mill.
5. *PLANORBIS ELEGANTULUS*. *Testa discoidea, albida, sub lente tenuiter striata, nitida, pellucida, supra convexiuscula, umbilicata, subtus plana; anfr. 4-5 lente accrescentes, ultimus infra medium obsolete carinatus; apertura perobliqua, sublunaris; peristomium rectum, intus calloso-albolabiatum.*
Diam. maj. $4\frac{3}{4}$, min. 4; alt. apert. 1 mill.
6. *AMPULLARIA WOODWARDI*. *Testa subturbinata, solidiuscula, parum nitida, longitudinaliter striata, late umbilicata, olivacea, fasciis viridibus vel fuscis spiralibus ornata; spira exserta; anfractus 4-4½ integri convexi, rapide accrescentes, supra medium angulati; ultimus efflatus, antice descendens; apertura ovato-lunaris, alba, fasciis intus pellucetibus; peristomium simplex, rectum.*
Diam. maj. 26, min. 22, alt. 29 mill.; apert. alt. $19\frac{1}{2}$, lat. $11\frac{1}{2}$ mill.
7. *AMPULLARIA TISCHBEKINI*. *Testa ovato-globosa, solida, peranguste umbilicata, rude longitudinaliter, sub lente subtilissime spiraliter striata, olivacea, fasciis saturatioribus cingulata;*

spira exserta; anfr. 3-4 integri convexi, rapide accrescentes, ad suturam impressam angulati; ultimus efflatus; apertura lunato-ovalis, intus fusca, dense fasciata; peristomium rectum, labro intus albido.

Diam. maj. 31, min. 28, alt. 33 mill.; apert. alt. 25, lat. 17 mill.

8. *NAVICELLA LIVESAYI. Testa oblongo-ovata, tenuis, parum pellucida, fusco-viridis, ad apicem rubescens, maculis triangularibus luteis ornata; apex ad dextram spectans, prominulus; apertura alba.*

Long. 35, lat. 15, alt. 6 mill.; apert. long. 18 mill.

9. *NAVICELLA SQUAMATA. Testa ovata, tenuis, pellucida, fusco-viridis, ad apicem rubescens, maculis luteis squamæformibus, striis fulguratis et maculis nigrescentibus picta; apex ad sinistram spectans, marginalis; apertura alba.*

Long. 18, lat. $12\frac{1}{2}$, alt. $5\frac{1}{2}$ mill.; ap. long. 15 mill.

10. *MELANIA CONFUSA. Testa turrata, solida olivacea vel nigricans; anfr. 10-11 planulati, spiralisulcati aut varicosi, longitudinaliter striati; apertura oblonga, albida, non detruncata. Operculum corneum, nigrescens, oblongum.*

Long. 72, lat. 18; apert. long. 22, lat. 11 mill., spec. max.

This species is one of the varieties of *M. aculeus*, Lea, under which name the most different things are joined. The operculum of *aculeus* is straight-lined, even concave on the left side; that of *confusa* is always convex. The lip of *aculeus* is not so far produced, the *columella* cut off sharply; the *confusa* rounded.

11. *MELANIA DATURA. Testa oblongo-pyramidata, fragilis, diaphana, fusco-nigricans, decollata: anfr. 3-4 ad suturam angulati; supra plani, subtus vix convexi, in angulo longis spinis, infra medium lineis elevatis ornati; apertura cærulea oblonga.*

Long. 21, lat. 11; apert. long. 10, lat. 5 mill.

12. *MELANIA LAYARDI. Testa turrata, solidiuscula, olivacea; anfr. 6-7 convexi, striis spiralibus, rugis longitudinalibus regulariter ornata, ad suturam fusco-maculata: apertura ovato-oblonga, intus cæruleo-albida; columella rotundata, peristomium valde productum, arcuatum.*

Long. 35, lat. 10; ap. long. 10, lat. 5 mill.; spec. max.

Var. *Minor, decollata, nigrescens, intus cærulea.*

Long. 22, lat. 7; ap. long. 7, lat. 4 mill.

4. DESCRIPTION OF TWO NEW SPECIES OF PINNA.
BY SYLVANUS HANLEY, F.L.S., ETC.

1. PINNA CHEMNITZII. *P. testa magna, subventricosa, olivacea, carinæ centralis experte, costis (circiter 14) angustis rotundatis et plerumque muticis ornata; ventrali triente fere lævigato, juxta umbones solum oblique pauciplicato: margine dorsali valde incurvato, plerumque squamis pectinato: extremitate postica lata, subtruncata, inferne subrotundata: margine ventrali postice cum margine dorsali parallelo, antice abrupte ascendente.*

Long. 5 pol., lat. 12 pol. et supra.

Hab. Insulæ Philippinæ (Cuming).

Mus. Hanley, Cuming.

Chemnitz has very fairly delineated (Conch. Cab. f. 770) this species as the *pectinata* of Linnæus, to which shell, indeed, it bears much resemblance. A few raised striæ succeed the distant ribs.

2. PINNA RUMPHII. *P. testa haud magna, subtrigona, incurvato-cuneiformi, nitida, cornea, in medio carinata, obsolete costata (costis muticis angustis postice evanidis), postice sublævigata, marginem ventralem versus late et oblique plicata: margine dorsali inermi, et valde incurvato; ventrali sinuato: extremitate postica inferne subrotundata.*

Long. 3 pol., lat. 6½ pol.

Hab. Insulæ Moluccæ.

Mus. Hanley, Cuming.

In the forty-sixth plate (figures I, K) of his 'Thesaurus,' Rumphius has very clearly indicated this somewhat scarce *Pinna*, which exhibits such peculiar characteristics as to render its determination an easy process.

5. PROPOSAL TO SEPARATE THE FAMILY OF SALAMANDRIDÆ,
GRAY, INTO TWO FAMILIES, ACCORDING TO THE FORM OF
THE SKULL. BY DR. J. E. GRAY, F.R.S., V.P.Z.S., PRES.
ENT. SOC., ETC.

In the Catalogue of Amphibia in the British Museum I placed all the Salamanders which have teeth on the inner side of the hinder edge of the palatal bone together into a single family, under the name of *Salamandridæ*.

Having lately procured the skulls of several of the genera so united, and also examined M. Gervais and M. Dugès' papers in the 'Annals of Natural Sciences,' in which the skulls of several other genera and species are figured, I am now induced to propose to divide the genera into three sections or families thus—

For in a group which offers so few permanent characters for the separation of the genera and species, and which presents such differ-

ent varieties in the form of the dermal appendages, and in the colour of the body in the different seasons of the year, one is very glad to seize on any part which appears to offer a permanent and tangible character :—

Fam. I. SEIRANOTIDÆ.

Seiranotina, Gray, Cat. B. M. 1850, 29.

Skull very depressed, broad; the fronto-temporal arch distinct and united to the bones of the skull (figure 1). Tongue large, hinder half free. Body granular. Palatine bones with a longitudinal series of teeth forming two diverging series, angular in front. Ribs well developed. Vertebrae crested above. Limbs and feet well ossified. Toes 4·4.

1. SEIRANOTA.

Lateral line none. Skin closely and equally granular, granules oblong.

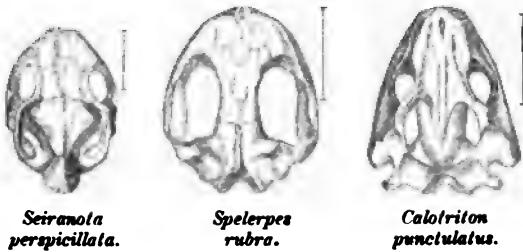
SEIRANOTA PERSPICILLATA (skull, fig. 1).

B.M.

Fig. 1.

Fig. 3.

Fig. 2.



*Sciranota
perspicillata.*

*Spelerpes
rubra.*

*Calotriton
punctulatus.*

Fam. II. PLEURODELIDÆ.

Skull depressed, broad, with a distinct fronto-temporal arch, formed by the union of a process of the frontal and temporal bone. Tongue moderate, attached; hinder and side edges scarcely free. Body granular. Palatine bone, with a longitudinal series of teeth forming two diverging series, angular in front. Ribs well developed. Vertebrae crested above. Limbs and feet well ossified. Toes 4·5.

a. *Fronto-temporal arch complete. Lateral lines of pore distinct, low down between the axilla and groin.*

2. PLEURODELES.

Ribs exserted, forming a series of spines along the sides. Head and skull depressed, broad. Paratoids distinct.

1. P. WALTII.

Skull, Erp. Gen. t. 101. f. 2.

"*Bradybates ventricosus*, Tschudi, t. 2. f. 1, is perhaps the young."—Dumeril. It only differs in the tail being short, perhaps injured.

3. GLOSSOLIGA.

Ribs enclosed. Head and skull very depressed. "Fronto-temporal arch with a separate central bone."—Gervais. Paratoid none; lateral pores small, single, in a continuous line.

1. GLOSSOLIGA POIRETI.

B.M.

Erp. Gen. t. 107. f. 1. Skull, Gervais, Ann. Sci. Nat. 1853, xx. t. 15. f. 9, & Erp. Gen. t. 102. f. 5, 6.

Forehead flat, with small scattered brown-tipped tubercles. Eyelids distinct, valvular.

N. Africa.

4. NOTOPHTHALMA.

Ribs enclosed. Head and skull rhombic. Forehead with two longitudinal ridges. Tongue oblong. Paratoids none. Cheek with three pits. Hind feet flattened. Tail compressed, keeled, slightly finned often above and below in breeding season.

N. America.

1. N. MINIATA.

B.M.

Skull, Erp. Gen. ix. t. 107. f. 2.

2. N. VIRIDESCENS.

B.M.

Vent in summer produced, truncated, with a rounded series of fringed filaments.

5. CYNOPS.

Tubercular. Head and skull very depressed, broad. Paratoid large, compressed; pores of lateral line small, distant, more distinct near the limbs. Fronto-temporal arch broad, distinct. Ribs enclosed.

1. C. PYRRHOGASTER.

B.M.

Skull, Tschudi, t. 2. f. 5, cop. Schlegel, Fauna Japon. t. 5. f. 7, 8; Cat. Batrach. B.M. t. 3. f. 13.

Japan.

6. TARICHA.

Tubercular. Head and skull depressed, broad. Paratoid large, compressed. Pores of the lateral line small, indistinct, far apart. Vent small. Fronto-temporal arch broad. Skin with conical tubercles. Ribs enclosed.

1. TARICHA TOROSA.

B.M.

Skull, Esch. Zool. Atlas, t. 21. f. 15.
California.

- b. *Fronto-temporal arch complete. Lateral line indistinct, marked with a vessel; ribs enclosed.*

7. CALOTRITON.

Hemitriton, part, A. Dugès.

Head and skull rhombic. Eyelids distinct. Skin smooth, with small black-topped conical warts. Tongue oblong. Paratoids none. Toes free; tips black, rather claw-like. Vent conical.

1. *CALOTRITON PUNCTULATUS* (skull, fig. 2). B.M.

Hemitriton punctulatus, A. Dugès, Ann. Sci. Nat. xvii. 265. t. 113. f. 1, 2; skull, Dugès, l. c. f. 3 & 18.

Triton puncticulatus, Erp. Gen. ix. 152. t. 106. f. 3; skull, t. 102. f. 4.

8. EUPROCTUS.

Hemitriton, part, A. Dugès.

Head and skull rhombic, depressed. Tongue oblong. Paratoids none. Skin smooth, with scattered small rounded black conic warts. Cloaca produced, conic. Lateral lines of pores none.

1. *EUPROCTUS RUSCONII*. B.M.

Hemitriton asper, skull, A. Dugès, Ann. Sci. Nat. xvii. t. 113. f. 21, 22.

H. cinereus, skull, Dugès, l. c. f. 14, 15; *H. rugosus*, skull, l. c. t. 1. f. 16, 17, and *H. Bitronii*, skull, t. 1. f. 19, 20, are evidently very nearly allied, if not all the same species.

9. LOPHINUS.

Body smooth. Palatine teeth in two separate series. Orbit in palate small. Fore toes slender, very unequal; the hind toes broad, webbed on each side, the two inner conic. Back three-ridged. Crest of male continued. Lateral lines with distant single pores. Tail of male suddenly truncated before the apex, ending in a filament.

1. *LOPHINUS PALMATUS*. B.M.

Selys-Longch. Faun. Belg. t. 5. f. 1, 2, good; skull, Dugès, l. c. t. 1. f. 27, 28.

Triton, Wooley; Baker & Deby, Zoologist, 1848, 2149, &c.

Triton minor, Higginbottom, Ann. & Mag. N. H. 1853, xii. 382. t. 16. f. 8, 9.

Lissotriton palmatus, Bell, British Reptiles, second edit. 1849, p. 154 (not of first edition).

"In the season of reproduction the tail of the male is suddenly truncated before the apex and terminated in a slender filament 3 lines in length. The hind feet perfectly palmated, all the toes united by

a membrane (t. 16. f. 8). When the breeding season is over, the slender filament is absorbed, and the truncated portion of the tail becomes obtusely rounded off with a slight indurated dark tip at the end, and the web of the hind feet is wholly absorbed, leaving the toes free (t. 16. f. 9).”—*Higginbottom*.

Mr. Bell admits and figures this species in the second edition of his ‘British Reptiles,’ 1849, p. 154. The figure is not characteristic, as the crest of the male is not sufficiently high, and the coloration is differently disposed from any specimen which has come under my observation.

10. OMMATOTRITON.

Body smooth. Palatine teeth in a crowded series. Orbits in palate large, convex. Crest of male interrupted over the loins. Legs with a membrane on the inner edge. Hands with a subulate tubercle. The hind toes free, very slightly fringed with membranes. Lateral line of pores distinct, single.

1. OMMATOTRITON VITTATUS.

B.M.

Triton vittatus, skull, Dugès, *l. c.* t. 1. f. 29, 30.
England; North of France; Belgium.

Mr. Bell, in his ‘British Reptiles,’ gives a good figure of one of my specimens of this species, which he is convinced “is to be considered as a variety only of the present species”—that is, *Liasotriton palmipes*. The osteological character, as well as the form of the dorsal crest, and the disposition of the colours, shows this is not the case, and that it is not only a distinct species but a very distinct genus, as is further proved by M. Dugès’ figure of the skull.

**** Fronto-temporal arch incomplete, ligamentous behind.**

11. PYRONICIA.

Hemisalamandra, Hemitriton, and Triton, part, Dugès.

Body slightly tubercular. Hinder toes fringed with a membrane. Back smoothish. Males with a crest. The skull with only a frontal process directed backwards and outwards, the temporal apophysis in the other genera being replaced by a tendinous cord.

1. PYRONICIA MARMORATA.

B.M.

Skull, *Erp. Gen.* t. 106. f. 1.

Hemisalamandra marmorata, Dugès, *Ann. Sci. Nat.* xvii. t. 1. f. 10, 11.

Back marbled, vertebral line pale. Pores of the lateral line distinct, in pairs. Skin smooth, punctulate, subtuberculous.
Oporto.

2. PYRONICIA PUNCTATA.

Triton punctatus, Dugès, l. c. t. 1. f. 25, 26; Bell, Brit. Rept. ed. 2.
Triton lævis, Higginbottom, Ann. & Mag. N. H. xii. 380. t. 16.
 f. 6, 7.

Lissotriton punctatus and *L. palmatus*, Bell, Brit. Rept. ed. 1,
 1839 (not Latr.).

Pupils circular, rather larger than those of *T. cristatus*.

The figures of the Smooth Newts (*Lissotriton*) in Mr. Bell's 'British Reptiles' (1839) are so destitute of character, that it is impossible to refer them to the known species with certainty. The figures of *L. punctatus* at pp. 132 and 135, appear to be that species in its winter state; and the figures of *L. palmipes* at p. 139 appear to be intended for the same species in summer, if we regard the disposition of the spots, and the height of the dorsal fin: but the fin is not dentated as it always is in that species, and the toes are not proper for it in its crested state; at the same time it bears no resemblance to the true *T. palmatus*, which has an entire crest; nor has it the filament at the end of the tail, which is always found in the crested form of that species.

In the second edition (1849), Mr. Bell has referred all these figures to *Lissotriton punctatus*, and places the figure which he formerly called *L. palmatus* at the head of the species, p. 143; but it is not characteristic of it, as wanting the dentation on the crest and the broad rounded end fringe of the toes, which are so characteristic of the crested state of the species.

Mr. Bell, believing that the form of the upper lip afforded a good character for the distinction of the species of these animals, divides them into two species, thus—"1. *Lissotriton punctatus*, upper lip straight, not overhanging the lower (p. 132, 138, fig. 2). *Lissotriton palmipes*, upper lip pendulous at the sides, overhanging the under in a distinct festoon as far as the base of the lower jaw. Toes of hinder feet fringed with a short membrane at all seasons." I may observe that the latter is not the *T. palmipes* of Latreille, which has the hind feet of the male in the breeding-season webbed; and that I believe it only differs from the former by being in the fully-developed state at the season of reproduction; and I am borne out in this idea by the observations of Messrs. Higginbottom, Hogg, and many others.

The former observes: "Some *Tritons* have been distinguished by the upper lip overhanging the lower. I have observed that in the first year of *Triton asper* the upper lip overhangs the under considerably at the sides; in the second it overhangs less; between the second and third year it becomes straighter, and in the fourth it overhangs again as much as in the first year. This is also very evident in the *Triton lævis*, in which the same changes take place."—Ann. & Mag. N. H. 1853, xii. 375.

"Neither kind of *Triton* is found in the water during the winter months; but they (the brick-makers) discovered great numbers of

them in holes in the clay, and sometimes ten or twelve coiled together. I have observed that either a very wet or very dry situation is fatal to the *Triton* during its state of hibernation, and that a moderately damp one is always chosen for that state of existence; and further, that the *Triton* can live in a solid mass of ice without injury.

"About the last week in March the perfect *Triton* leaves the land and becomes aquatic. It has then acquired all those appearances which exist only during the breeding-season. They are absorbed rather rapidly, and the animal leaves the water in August.

"The *Tritons* of the third and fourth year are found during the cold season in the earth under stones, in clusters of the magnitude of a cricket-ball; those of an earlier period are often found singly at a greater depth under the earth, as before stated."—p. 381.

12. HEMITRITON.

Body tubercular. Males with a slightly-produced vent. Lateral line none.

1. HEMITRITON ALPESTRIS.

B.M.

Hemitriton alpestris, Dugès, *l. c. t.* 1. f. 23, 24; Fauna Ital. t. 8. f. 2.

Fam. III. SALAMANDRIDÆ.

The skull narrow, without any dilation of the frontal or temporal bone to form a fronto-temporal arch. Palate with a longitudinal series of teeth, arched in front. Tongue moderate, attached, hinder and side edges scarcely free. Body granular. Vertebrae rounded. Ribs and bones of limbs and feet imperfectly ossified. Paratoids large, glandular.

* *Lateral lines of pores high up the back, elevated, wart-like.*

1. SALAMANDRA.

Palatine teeth extending before the internal nostrils. Tail roundish. Back not crested.

1. SALAMANDRA ATRA.

B.M.

Skull; Dugès, *l. c. t.* 1. f. 8, 9.

2. SALAMANDRA MACULOSA.

B.M.

Skull, Dugès, *l. c. t.* 1. f. 6, 7.

3. SALAMANDRA CORSICA.

Mouth, Bonap. Fauna Ital. ii. t. 53 (cop. Dugès, *l. c. t.* 1. f. 4, 5).

**** Lateral line of pores on lower part of side between axilla and groin.**

2. TRITON.

Granular. Tail compressed. Back of male crested. Toes free, simple.

1. TRITON CRISTATUS.

B.M.

Hemisalamandra cristata, skull, Duges, *l. c.* t. 1. f. 12, 13 (Erp. Gen. ix. t. 102. f. 2, 3, not sufficiently broad for our specimens).

Triton marmoratus, Bibron, Proc. Zool. Soc. 1838, 23 (not Latr.).

Triton cristatus & *T. Bibronii*, Bell, Brit. Rept. pp. 129, 131, figs.

Pupil small, circular. Tail with a broad pale-bluish longitudinal streak rather below the centre.

M. Bibron, when in London, on observing a specimen of the Warty Newt with straight lips, in the Collection of the Zoological Society, named it *Triton marmoratus*, probably thinking that it was *Triton marmoratus* of Latreille, a species of the South of Europe.

Mr. Bell, in his work on British Reptiles, figures the specimen, and gives it the name of *Triton Bibronii* (pp. 129 & 131, figs.), observing, "it is the same as *Tr. cristatus*, excepting that the upper lip is perfectly straight."

After examining various specimens in different states, I am convinced that the form of the lip depends on the season, the male in the breeding-season having the most overlapping lip.

The same change in the form of the lip in the different seasons is to be observed in *Lissotriton punctatus*.

Mr. J. Higginbottom observes: "The two species of *Triton* (found in the Midland Counties) present such varied appearances during the three years of their slow but progressive growth, and during the changes they experience preparatory to their return from being inhabitants of the land, breathing atmospheric air, active in the summer and hibernant in the winter, to being denizens of the water, reproducing their kind in the months of March, April, May, June and July, that I think they have been regarded by naturalists as presenting too great a number of distinct species."—*Ann. & Mag. N. H.* 1853, xii. 370.

The skulls and skeletons of all the genera of *Molgidae*, *Plethodontidae*, *Protonopsidae* and *Amphiumidae* I have been able to examine, or which are figured in any works that have occurred to me, resemble those of the family *Salamandridae*.

Considering the very important characters which the examination of the skulls have shown them to possess for the distinction of the European and Japan species, it is very desirable that the American species should be carefully examined for the same purpose. Up to this time even the description of the palatine teeth of the American species is involved in great uncertainty, the descriptions of Harlan, Holbrook and Baird being often at issue on this important point. It is but just to observe, that when I have had the opportunity of

comparison, I have generally found the description of Dr. Baird the most accurate and trustworthy.

To facilitate this object, I have added a list of the species, the skulls of which have been figured.

Fam. MOLGIDÆ.

MOLGE STRIATA, Gray, Cat. Batr. p. 31. t. 3. f. 111; Schlegel, Fauna Japon. t. 5. f. 9, 10.

Fam. PLETHODONTIDÆ.

ONYCHODACTYLUS JAPONICUS, Gray, Cat. Batr. p. 33. t. 3. f. 1; Fauna Japon. t. 3. f. 6.

AMBYOSTOMA OPACUM, Dum. et Bibr. E. Gén. ix. t. 10. f. 6.

PLETHODON GLUTINOSUM, Tschudi, Batr. t. 2. f. 4.

DESMOGNATHUS FUSCUS.

Plethodon fuscum, Dum. et Bibr. Erp. Gén. t. 101. f. 3. B.M.

SPELERPES RUBRA (skull, fig. 3).

"*Bolitoglossa rubra*, Cab. B.M." from Paris.

GEOTRITON FUSCUS, sp., Dum. et Bibr. E. G. ix. 112. t. 102. f. 1.

ŒDIPUS VARIEGATUS.

Bolitoglossa mexicana, Dum. et Bibr. Erp. Gén. ix. p. 3. t. 101. f. 4.

ENSATINA ESCHSCHOLTZIA, Esch. Zool. Atlas, t. 22.

6. ON THE POWER OF DISSOLVING SHELLS POSSESSED BY THE BERNARD CRAB (PAGURUS). BY DR. J. E. GRAY, F.R.S., V.P.Z.S., PRES. ENT. SOC., ETC.

In a note to my paper "On the Formation and Structure of Shells," in the 'Philosophical Transactions' for 1833, I stated it is probable that some Bernard Crabs have also the faculty of dissolving shells, for it is not unusual to find the long fusiform shells (such as *Fusus fasciolarus* and *turbinella*) which are inhabited by these animals, with the inner lip and great part of the pillar on the inside of the mouth destroyed, so as to render the aperture much larger than usual.

Having continued my observations on these shells, I am convinced that certain species of Bernard Crab (*Pagurus*) have the power, some possessing it to a much greater degree than others.

Lieut. Burnaby lately brought a number of Crustacea to the British Museum from the South Seas; amongst which there were

several specimens of *Paguri* in shells, and these shells were more destroyed than any I had before observed. One, a specimen of *Persona tuberosa*, not only had the whole of the thickened rounded inner lip; but the whole of the septa between the whorls up to the apex of the shell were also destroyed, so as to convert the shell into a simple conical cavity, and the greater part of the substance of the outer lip was also removed from the inner surface, so as to render the outer part of the shell very thin—indeed so much was removed, that the series of pits on the outer surface, just above the marginal varix of the outer lip, were entirely destroyed, converting the pits into a series of apertures; and the other shells inhabited by these Crustacea were similarly destroyed. The internal surface of the shell has the appearance of being ground away by a file or other rough surface.

7. REMARKS ON THE BRITISH ACTINIADÆ, AND RE-ARRANGEMENT OF THE GENERA. BY W. THOMPSON.

Observations extending over many years, on the characters and the habits of the British species of the *Actiniadæ*, clearly proved to me that the genera of British *Actiniæ* required great alterations; and I submit the present classification as an improvement on those hitherto used.

It is well understood that the principal generic characters are derived from modifications, and differences existing in the tegumentary system and in the tentacula. Dr. Johnston, in his 'History of British Zoophytes,' published in 1847, made but one British genus, *Actinia* of Linnæus, and in this he included all known British species; but he divided it into two sections or subgenera, the one characterized by having the skin smooth, the other by having the skin covered with porous warts. Mr. Gosse, in a paper read before the Linnean Society in the early part of 1855, divided the family into three genera; namely, *SAGARTIA*, destitute of warts, and emitting filaments from pores; *BUNODES*, studded with warts, and without pores and filaments; and *ACTINIA*, having a perfectly smooth skin, and destitute of warts, pores or filaments. The character arising from the presence or absence of filaments is not of very great weight, inasmuch as the presence of filaments depends entirely on the presence of pores in the skin, and through which they are extruded; consequently, when there are no pores there are no filaments.

These genera comprised species possessing characters so different from each other, and so well established, that I found they must not remain united. For instance, the genus *Sagartia* included, amongst others, *A. dianthus*, *A. bellis* and *A. parasitica*; but although the characters were useless as generic distinctives, yet they appear to me to be of sufficient importance to be used as characters for the division of the *Actiniadæ*, and I have accordingly used them for that purpose.

NO. CCCLVI.—PROCEEDINGS OF THE ZOOLOGICAL SOCIETY.

On examining Milne-Edwards's 'Histoire des Corallaires,' I was pleased to find that my views on this point were in accordance with that naturalist, he having divided the family into three sections, which he calls respectively *Smooth Actinia*, *Warty Actinia*, and *Perforated Actinia*, or with pores, each being equal to one of Mr. Gosse's genera and my subdivisions. The true generic characters of the *Actiniadæ* are to be found (as I have already mentioned) in the integuments and in the tentacula; these latter, although varying with age, are yet constant in form and number in adults of the same species. From these characters amongst others, I had divided the family into eight genera (exclusive of *Anthea* and *Adamsia*), of which the types were *Actinia equina*, *A. gemmacea*, *A. clavata*, *A. bellis*, *A. viduata*, *A. dianthus*, *A. parasitica* and *A. coriacea*; and these I named respectively *Actinia*, *Bunodes*, *Cyrtactis*, *Heliactis*, *Sagartia*, *Actiniloba*, *Aster*, and *Cribrina*. My divisions and genera were formed from examinations of British species only, and I was not a little surprised to find that they so closely accorded with Milne-Edwards's labours, founded as they are on an examination of all described species. The only genus containing a British species that I have not verified is his genus *Dysactis*, in which he includes *A. biserialis*. This species, however, was described by the late Professor Forbes as occurring plentifully on the shores of the island of Herm; I have therefore admitted it as a genus on the authority of Milne-Edwards. The British species are distributed amongst six of his genera, namely, *Metridium*, *Actinia*, *Paractis*, *Dysactis*, *Cereus*, and *Adamsia*; of these, *Actinia* is the same as mine, *Paractis* I have used in lieu of *Sagartia*, and *Dysactis* I also admit unaltered—they are represented by *Actinia equina*, *Actinia viduata* and *Actinia biserialis*. My genus *Actiniloba* is the same as his genus *Metridium*, and includes *Actinia dianthus*. I retain *Actiniloba*, as being the most characteristic name. His genus *Cereus* includes *A. coriacea*, *A. gemmacea*, *A. clavata* and *A. bellis*; these species, it was quite evident, could not be included in one genus; indeed M.-Edwards divides his genus *Cereus* into several sections, *A. coriacea* being in one section, *A. gemmacea* and *A. clavata* in a second, and *A. bellis* in the third. Restricting, therefore, his genus *Cereus* to *A. gemmacea*, instead of retaining Mr. Gosse's name *Bunodes*, I retained my division of the remainder of the species under the generic names of *Cribrina*, *Cyrtactis* and *Heliactis*. His genus *Adamsia* includes *Actinia parasitica* and *Adamsia palliata*, two very dissimilar species. No one, I am sure, who has ever seen these Polypes would imagine for an instant that they can possibly belong to the same genus; and indeed the fact that *Adamsia palliata* secretes a horny base, an incipient polypidom, induces me to suggest the necessity of forming on its characters a distinct family. I have therefore formed a genus for the reception of *Actinia parasitica*, and withdrawing the suggested name *Sagartia* from the genus that will now stand as *Paractis*, I have transferred it to this genus. The genus *Adamsia* I at present retain under the family *Actiniadæ*; and without entering into the question in this paper as to its proper position, I would suggest that it will eventually be placed between

the Polypes that secrete a polypidom and those without a polypidom.

Of late years *Adamsia palliata* has so decreased in this locality, that I have seen but one since the severe winter some three or four years ago; this was given me in September last by my friend Mr. Busk, and is still alive and well in one of my tanks, but too valuable to submit to the dissecting knife. I trust this summer to obtain other specimens, when I hope to settle its proper position amongst the Anthozoa.

As regards species, I refrain from touching on that point in the present paper, but purpose doing so at an early period, when a careful examination of a larger number of individuals shall enable me to speak with authority as to which are *bond fide* species and also those that are merely varieties. The rage for marine vivaria has thrown many useless workers into the field; and I much fear that what may possibly tend to a love of nature does not always as a matter of course advance science. The improper multiplication of species is a serious injury to the well-being of Natural History; and I must admit I should like to see a council formed of five, ten, fifty, or any number of the most celebrated naturalists, and that no new species or arrangement should be published without their consent being first obtained. This would effectually prevent varieties and deformities creeping in as species, and objects already described and known being reproduced as new species, or, may be, even as a new genus.

Proposed rearrangement of British Actiniadæ, with a revision of the genera :—

ANTHOZOA, Owen.

Body soft, contractile, in every part symmetrical. Tentacles hollow, possessing thread-cells, and in most with pectinated margins, in uninterrupted circles or groups. Stomach suspended by radiating mesogastric folds in an abdominal cavity. No intestine; mouth and vent generally one, placed in the centre of the upper disk, very dilatible. With or without polypary; when present usually internal.

Without polypary.

ACTINIADÆ.

Free and solitary, or gregarious. Tentacles simple, rarely branched or clavate, more than twelve often in more than one row in uninterrupted circles. Body single, fleshy, elongate or conical, fixed by its base, and generally with the power of locomotion. Base broad and adherent.

A. *Tentacles conical.*

AA. *Body without warts or pores; skin smooth.*

ANTHEA, Johnston.

Body adherent, cylindrical, smooth, without tubercles on the

edge of disk. Tentacles numerous, elongated, taper, flaccid, scarcely retractile, longer than diameter of disk.

Type *Anthea cereus*.

ACTINIA, Linnæus.

Body smooth, conoid or cylindrical. Tentacles numerous, in one or more uninterrupted circles, conical, undivided, subequal and entirely retractile, shorter than diameter of disk; margin of upper disk furnished with a row of tubercles.

Actinia mesembryanthemum.

PARACTIS, M.-Edw.

Body smooth, conoid or cylindrical. Tentacles few in number, in one or more uninterrupted circles, conical, undivided, subequal, filiform, very long. No tubercles on the edge of the upper disk.

Actinia viduata.

DYSACTIS, M.-Edw.

Tentacles forming two distinct circles, continuous at their base, those of the inner row three times as long as the outer row, numerous, short and subequal. Margin of disk without tubercles.

Actinia biserialis.

BB. *Body studded more or less with verruciform tubercles or sucking-glands.*

CRIBRINA, Ehrenb.

Body studded with glandular warts irregularly placed, suctorial, distributed over the whole surface of the body. Tentacles short, thick, obtuse, subequal, very numerous.

Actinia coriacea.

CEREUS, M.-Edw.

Body with glandular warts, placed in vertical lines and unequal. Tentacles not numerous, chiefly marginal, much spread and bent, conical, rather stout; length about equal to diameter of disk.

Actinia gemmacea.

CYRTACTIS, mihi.

Body rough, with sucking-glands in close-set perpendicular ridges or vertical rows, and all equal, the whole height of the body. Centre of disk much more raised than the edges. Disk greater in diameter than the pillar of the body. Tentacles long, moderately slender, generally horizontal to the disk, mostly marginal, their tips constantly curled back.

Actinia clavata.

HELIACTIS, mihi.

The glandular warts placed only on the upper portion of the body. Tentacles very numerous, short, varying in length, crowded towards

the edge of the disk, and of moderate thickness ; oral disk much expanded.

Actinia bellia.

CC. *Body without glandular warts, and with pores for the passage of thread-cells.*

ACTINILOBA, Blainv.

Skin soft, disk very large. Tentacles very numerous, short, varying but little in length, and forming a thick filamentous fringe ; margin of disk lobed.

Actinia dianthus.

SAGARTIA, Gosse.

Skin coriaceous, occasionally wrinkled, firm to the touch. Tentacles numerous, not particularly long, retractile, having great power of elongation. Base broad and circular. Body cylindrical. Pores situated near the base, and varying in size. Parasitic.

Actinia parasitica.

ADAMSIA, Forbes.

Skin soft. Tentacles scarcely retractile, short. Base when young circular, afterwards expanding laterally until the extreme points meet, and form a circle. Disk circular or oblong, according to the form of the base. Base secreting a horny membrane. Body much depressed, not cylindrical.

Adamsia palliata.

March 23, 1858.

Dr. Gray, F.R.S., V.P., in the Chair.

Mr. Gould exhibited and described a new species of Toucan which he had recently received from Professor Jameson of Quito. He remarked that it belonged to that division of the group to which he had applied the generic term of *Andigena*, and that it was most intimately allied to the *A. nigrirostris*, but differed from that species in the bill being shorter, broader, and much more robust, and coloured with obscure brownish red at the base of the upper mandible. For this new species he proposed the name of

ANDIGENA SPILORHYNCHUS.

Crown of the head and back of the neck glossy black ; back, wing-coverts and margins of the primaries dull sienna-brown ; secondaries bluish brown ; upper tail-coverts blue strongly tinged with

green; tail slaty blue tinged with green, the four central feathers largely tipped with chestnut; band across the rump sulphur-yellow; throat and cheeks white, blending into the light blue of the breast and abdomen; thighs rich chestnut; under tail-coverts blood-red; feet greenish blue, with a lilac tinge on their under surface; bill black, with a mark of obscure brownish red at the base of the upper mandible, which, when viewed in front, much resembles the letter W, this colour advancing for a short distance on each side of the culmen, and extending down the sides of the base.

Total length, 18 inches; bill, $3\frac{1}{2}$; wing, 7; tail, $7\frac{1}{2}$; tarsi, $1\frac{1}{2}$.

Hab. Forest of Beza, on the eastern side of the Cordillera in Ecuador.

The following papers were read :—

1. NOTE ON THE VARIATION OF THE FORM OF THE UPPER MANDIBLE IN A RAPACIOUS BIRD. BY PHILIP LUTLEY SCLATER.

Mr. J. H. Gurney has called my attention to the great variation in the form of the upper mandible of *Urubitinga uncinata*, as observable in the specimens now before the Society, which form part of his collection. I have seen the same sort of thing in the case of other *Accipitres*, but never carried to such an extent as in the present instance. In one of these birds (fig. 1) the lateral margins of the upper mandible are strongly festooned, and project far down

Fig. 1.



Fig. 2.



over the edges of the lower. In a second specimen (fig. 2)—apparently of about the same age, both being in immature plumage—the commissure is very nearly straight. In other examples there is merely a slight festoon. As the formation of the edges of the upper mandible is much in use as a generic character—rightly enough, I believe, and not generally liable to lead to error—the present abnormal variation seems worthy of notice.

2. ON SIPHONARIA. BY SYLVANUS HANLEY.

Having examined the whole of the specimens delineated in the recent Monograph of this genus in the 'Conchologia Iconica,' I have been induced to describe a few additional species, and to offer a few remarks upon the subject. From the versatility of form and sculpture exhibited by most Limpets, the synonymy of the *Siphonaria* demands a greater amount of leisure to elaborate than I can at present anticipate; but in the confident belief that the following crude list of published species, being the most ample which has yet appeared, cannot fail to aid and interest the future student of this difficult genus, I now transcribe it from my note-book. A single asterisk is appended where the species has been adopted or defined by Mr. Reeve; twin asterisks denote that, although mentioned, it has been regarded by him as superfluous or varietal:—

- **acuta*, Quoy, Zool. Astrol.
- Adansoni*, Blainville, Dict. Sc. Nat. xlix. (= *pectinata*).
- **æquilorata*, Reeve, Conch. Icon.
- ***albicans*, Quoy, Zool. Astrol.
- Algesira*, Quoy, ibid. (probably = *pectinata*).
- alternata*, Say, Americ. Conch. (seems immature).
- alternicostata*, Potiez et Mich. Gal. Douai.
- **amara*, Nuttall, MSS. in Reeve, Conch. Icon.
- Antarctica*, Gould, Exped.
- aspera*, Krauss, Süd-afrik.
- **atra*, Quoy, Zool. Astrol.
- Australis*, ibid.
- **Bacani*, Reeve, Conch. Icon.
- Belcheri*, Hanley, Proc. Zool. Soc.
- **bifurcata*, Reeve, Conch. Icon.
- Blainvillei*, Hanley, Proc. Zool. Soc.
- **Brasiliana*, Reeve, Conch. Icon.
- brunnea*, Hanley, Proc. Zool. Soc.
- **cancer*, Reeve, Conch. Icon.
- Capensis*, Quoy, Zool. Astrol.
- carbo*, Hanley, Proc. Zool. Soc.
- **characteristica*, Reeve, Conch. System.
- **cochleariformis*, Reeve, Conch. Icon.
- **concinna*, Sowerby, Proc. Zool. Soc.
- conica*, Blainville, Dict. Sc. Nat.
- ***Coreensis*, Adams & Reeve, Zool. Samarang.
- cornuta*, Gould, Proc. Bost. Soc.
- **corrugata*, Reeve, Conch. Icon.
- **costata*, Sowerby, Proc. Zool. Soc. = *lineolata*, Reeve.
- costata*, Hombron and Jacquinot.
- crenata*, Blainville, Dict. Sc. Nat.
- **denticulata*, Quoy, Zool. Astrol.
- **Diemenensis*, ibid.
- ***exigua*, Sowerby (as of Martini), Genera.

- exulorum*, Hanley, Proc. Zool. Soc.
 **ferruginea*, Reeve, Conch. Icon.
 **fuliginata*, ibid.
 **fumculata*, ibid.
grisea (as *Patella*), Gmelin, Syst. Nat. (= *pectinata*.
Gnamensis, Quoy, Zool. Astrol.
lirata, Reeve, Conch. Icon.
 **gigas*, Sowerby, Tankerv. Cat.
inculta, Gould, Proc. Bost. Soc.
Japonica (as *Patella*), Donovan, Nat. Repos.
Javanica (as *Patella*), Lamk. Anim. s. Vert. (? = *exigua*).
Jonasii, Dunker, Guin.
 **Kurracheensis*, Reeve, Conch. Icon.
lævis, Philippi, Zeitschr. Mal.
 **læniuscula*, Sowerby, Proc. Zool. Soc.
lateralis, Gould, Proc. Bost. Soc.
lecanium, Philippi, Zeitschr. Mal.
lepada, Gould, Proc. Bost. Soc.
 ***Lessoni*, Blainville, Malac.
leucopleura, Blainville, Dict. Sc. Nat.
 **lineolata*, Sowerby, Proc. Zool. Soc. = *costata*, Reeve.
 **Luzonica*, Reeve, Conch. Icon.
 **Macgillivrayi*, ibid.
Magellanica, Philippi, Mal. Blat.
 **Maura*, Sowerby, Proc. Zool. Soc.
Le Mouret, Adanson, Senegal.
Natalensis, Krauss, Süd-afrik.
normalis, Gould, Proc. Bost. Soc.
Nuttallii, Hanley, Proc. Zool. Soc.
 **obliquata*, Sowerby, Tankerv. Cat.
oculus, Krauss, Süd-afrik.
 **palpebra*, Reeve, Conch. Icon. (= *pectinata*).
parma, Hanley, Proc. Zool. Soc.
pectinata (as *Patella*), Linn. Syst. Nat.
 **pica*, Sowerby, Proc. Zool. Soc.
picta, D'Orbigny, Amér. Mérid.
placentula, Menke, Zeitschr. Mal.
 ***plana*, Quoy, Zool. Astrol.
 ***plicata*, ibid.
 ***punctata*, ibid.
radiata, Blainville, Dict. Sc. Nat.
radiata, Sowerby, Proc. Zool. Soc.
 **redimiculum*, Reeve, Conch. Icon.
Savignyi, Philippi, Zeitschr. Mal. (= *crenata*).
 **seabra*, Reeve, Conch. Icon.
 **scutellum*, Deshayes, Mag. Zool. (= *obliquata*).
sipho, Sowerby, Genera Shells.
 **Siquijorensis*, Reeve, Conch. Icon.
Sowerbyi, Mich. Mag. Zool.
 **spinosa*, Reeve, Conch. Icon.

- stellata*, Blainville (as of Roissy), Dict. Sc. Nat.
striato-costata, Dunker, Guin.
subrugosa, Sowerby, Proc. Zool. Soc.
**Tristensis*, Sowerby (as of Leach), Genera Shells.
umbonata, Menke, Zeitschr. Mal.
variabilis, Krauss, Süd-afrik. (as = *concinna*).
**venosa*, Reeve, Conch. Icon.
viridis, Quoy, Zool. Astrol.
**zebra*, Reeve, Conch. Icon.
***Zelandica*, Quoy, Zool. Astrol.

S. NUTTALLII. *S. testa ovata, subsymmetrica, conica aut subconica, crassa, costis parvis rotundatis, costulisque depressioribus, arete radiata; squalide albida, interstitiis costarum fumoso-fuscis: apice centrali, piceo, acuto: pagina interna superne castanea, inferne flavescente, seu pallida, lineis brunneis radiantibus ornata: siphunculo inconspicuo.*

Long. 7 lin., lat. $5\frac{1}{2}$ lin.

Hab. Littora Insularum Sandvicensium (Dr. Frick). Mus. Cuming.

Very like a dwarf *Patella vulgata*. The ribs occasionally are slightly nodulous.

S. BELCHERI. *S. testa tenui, ovata, subconica, brunnea, costis (plerumque pallidioribus, seu albidis) parvis, simplicibus, rotundatis, subremote radiata: lateribus valde inaequalibus: apice acuto, recurvo, postico, nigrescente; costa siphonifera conspicua: superficie interna suturate brunnea, plerumque ad marginem laciniosum albedo-subarticulata.*

Long. 7 lin., lat. $5\frac{1}{2}$ lin.

Hab. —? Mus. Hanley.

Was brought over in the 'Samarang' by Sir E. Belcher, and probably taken in the Indian seas. It is prettily vandyked with white on the inner margin. The ribs are about 25 to 30 in number.

S. BLAINVILLEI. *S. testa subovata, conica, crassiuscula, subsymmetrica, costis permultis, laevibus, rotundato-planulatis, et marginem versus costulis depressioribus alternantibus, undique radiata; interstitiis costarum albarum chocolateis, haud angustis: costa siphonifera vel nulla vel inconspicua: apice subcentrali: superficie interna superne albida, deinde brunnea, marginem versus subsimplicem pallida et lineis geminis fuscis pulchre radiata.*

Long. $10\frac{1}{2}$ lin., lat. $8\frac{1}{2}$ lin.

Hab. —? Mus. Hanley.

The apex of the only individual I have ever seen has been worn smooth; it is ochraceous, and upright. There are about 30 well-separated ribs, and the same number of intervening riblets. The siphon is almost superficial, but is indicated by the absence of colouring matter.

3. DESCRIPTION OF A NEW GENUS OF BOIDÆ FROM OLD CALABAR, AND A LIST OF W. AFRICAN REPTILES. BY DR J. E. GRAY, F.R.S., V.P.Z.S., PRES. ENT. SOC., ETC.

(Reptilia, Pl. XIV.)

Mr. Logan kindly sent to me for examination a number of Snakes and other reptiles which had been collected by the missionaries in Old Calabar.

Among several very interesting species I observed a new genus of the family *Boidæ*, which I have great pleasure in laying before the Society, more especially as it appears to be the indication of a new tribe in that curious family.

This animal belongs to the second section of the family, which is thus characterized :—

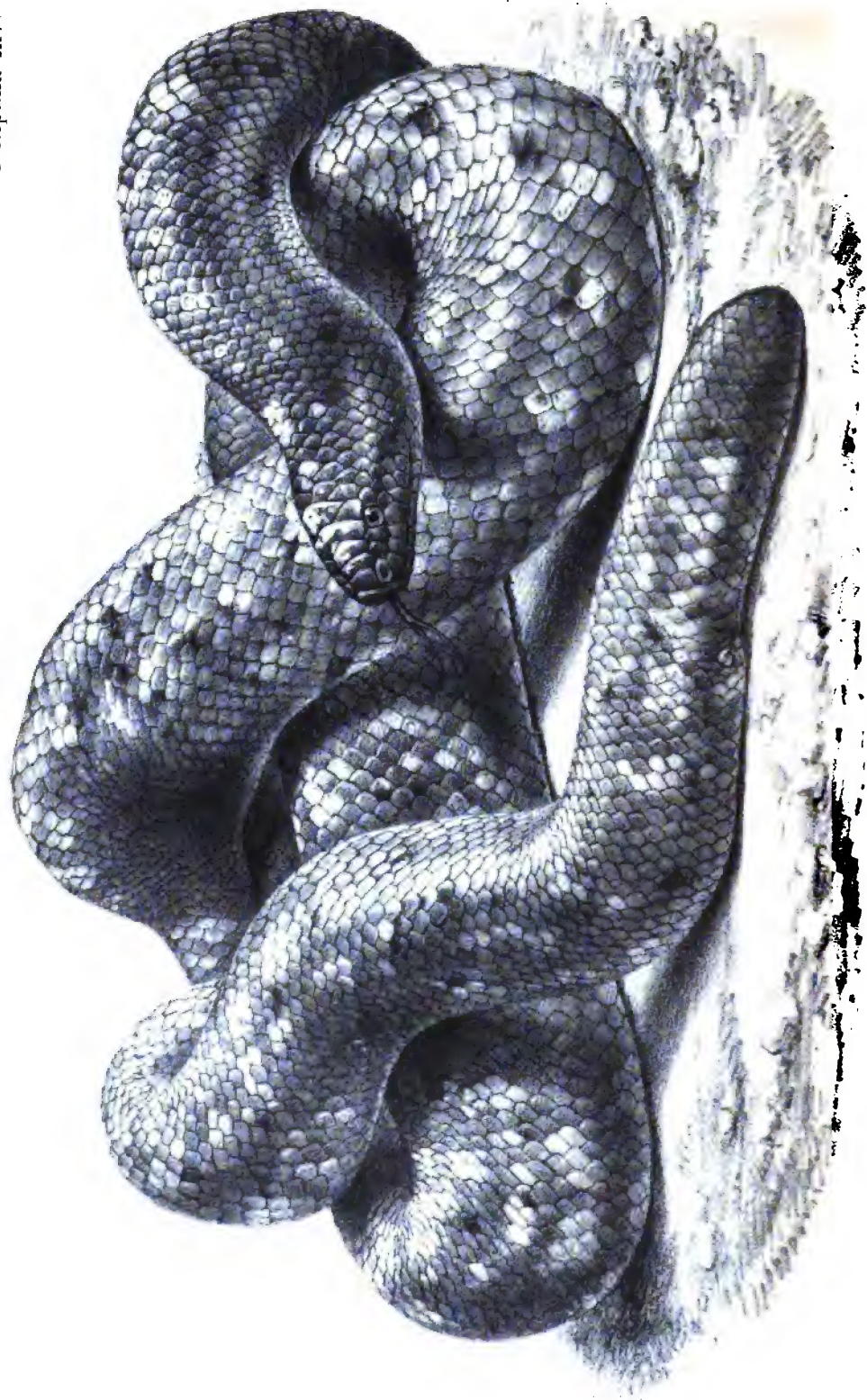
- ii. *Tail very short, not, or only very slightly, prehensile. Head indistinct, short.*

It is entirely distinct from the tribes *Cylindrophina*, *Carinina*, and *Tortricina*, and therefore I propose to form for it a tribe (*Calabariina*) by itself, having the same characters as the genus.

CALABARIA.

Head small, short, rounded in front, the same size as the body. Muzzle depressed, rounded; labial shields flat, $\frac{8-9}{9-9}$; the hinder small, front moderate; rostral shield high, large, triangular; frontal shields three pairs, band-like, subsimilar, followed by a band-like shield continued from side to side, which has behind it a small sub-triangular shield on each side, with a central large triangular shield between them on the crown. Eyes surrounded by scales on the upper edges of the upper labial shields and the outer edges of the fourth and fifth frontal plates, and with one ocular shield in front and two smaller behind the eyes; loreal shield single, small. Pupil circular. Nostril lateral, between two small nasal shields. Body cylindrical. Scales broad, triangular, polished, rather sunken and subrugose in the centre. Ventral shields very numerous, band-like, transverse, about half as wide as the diameter of the body. Vent small, with a single preanal shield. Spurs large, distinct. Tail short, as thick as the body, blunt and rounded at the end. Sub-caudal shields broad, band-like, one-rowed like the ventral shields.

I think it is probable, when some other specimens have been examined, that the band-like shield extending across from the upper edge of each eye will be found to be composed of three shields, like the band behind it, which are here united into one band; and then the head-shields will lie thus :—three pair of band-like frontal, two smaller triangular superciliary shields over each eye, having in the middle between them two triangular parietal shields.



CALABARIA FUSCA (Pl. XIV.).

Dark brown, some of the scales yellowish, scattered singly or in groups on the back and sides; ventral shields greyish; sides of the belly with a few unequal yellow spots.

Length 36 inches, diameter 1 inch.

Hab. Old Calabar, W. Africa (*W. Logan, Esq.*).

Since this paper was read, I have discovered a young specimen of this Boa among the specimens from the Zoological Society, which they had received from Fernando Po. It is about half the length and diameter of the specimen from Old Calabar. It has the head-shields more uniform, and as I supposed they might be when I described that specimen.

It has three pairs of band-like frontal shields over the forehead, a rather large parietal shield behind them on the crown of the head, and two small subequal superciliary shields between the outer edge of the parietal and the eye, on each side, a narrow transverse band-like central shield behind, and rather broader than the parietal shield, with a small scale-like shield, like those on the neck, behind and on the sides of it.

Having had occasion to look through many papers by Dr. Edward Hallowell, on the Reptiles of Liberia and Gaboon, in the 'Journal of the Academy of Natural Sciences of Philadelphia,' to find if the above *Boideæ* and other reptiles in Calabar had been described, I have been induced to prepare a list of the Reptiles and Batrachians which have hitherto been recorded as inhabiting Western Africa, giving a reference to where the species have been described, and the special habitat of the species noticed.

1. *Regenia ocellata*.

Regenia ocellata, Gray, Cat. 9.

Uranus ocellatus, Rüppell, D. & B.
Senegal.

2. *Monitor Niloticus*.

Monitor Niloticus, Gray, Cat. 11.

Uranus Niloticus, Dum. & Bibr.
Gaboon (*Hallow.*); Ashantee (*Bowdich*).

3. *Lacerta ocellata*.

Lacerta ocellata, Daud.; Gray, Cat. 30.
Senegal?

4. *Tachydromus Fordii*.

Tachydromus Fordii, Hallowell, P. A. N. S. Philad. 1857, 48.
W. Africa; Gaboon.

"The African species differs in no respect from the Asiatic, except in the presence of the small plate imbedded between the outer nasal and the frontal and the two front nasals."—*Hallowell*.

5. *Gerrhosaurus nigrolineatus*.

Gerrhosaurus nigrolineatus, Hallowell, P. A. N. S. Phil. 1857, 49.
W. Africa; Gaboon.

6. *Mococa Africana*.

Mococa Africana, Gray, Cat. 83.
W. Africa. B.M.

7. *Euprepis Perrotetii*.

Euprepis Perrotetii, D. & B. v. 669; Gray, Cat. 111.
Senegal.

8. *Euprepis Raddoni*.

Euprepis Raddoni, Gray, Cat. 112.
W. Africa.

9. *Euprepis Stangeri*.

Euprepis Stangeri, Gray, Cat. 112.
W. Africa, Niger Expedition (*Dr. Stanger*).

10. *Euprepis quinquetæniatus*.

Euprepis quinquetæniatus, Wagler; Gray, Cat. 113.
W. Africa; Senegal.

11. *Euprepis albilabris*.

Euprepis albilabris, Hallowell, P. A. N. S. Philad. 1857, 51.
Gaboon.

12. *Euprepis Harlani*.

Euprepis Harlani, Hallowell, P. A. N. S. Philad. 1854, 100.
Plestiodon Harlani, Hallowell, l. c. 170.
Liberia.

13. *Euprepis striata*.

Euprepis striata, Hallowell, P. A. N. S. Philad. 1854, 98.
Liberia.

14. *Euprepis Blandingii*.

Euprepis Blandingii, Hallowell, P. A. N. S. Phil. ii. 58; 1857, 50.
Liberia; S. Africa?

15. *Euprepis frenatus*.

Euprepis frenatus, Hallowell, P. A. N. S. Philad. 1857, 50.
Liberia.

16. *Sphenorhina elegans*.

Sphenorhina elegans, Hallowell, P. A. N. S. Philad. 1857, 52.
Acontias elegans, Hallowell, l. c. 1852, 65.
W. Coast of Africa; Gaboon.

17. *Feylenia Currori*.

Feylenia Currori, Gray, Cat. 129.
Angola (*J. Curror, Esq.*).

18. Onychophis Liberiensis.

Onychocephalus Liberiensis, Hallowell, P. A. N. S. Philad. 1854.
Liberia; Calabar.

19. Onychophis nigrolineatus.

Onychocephalus nigrolineatus, Hallow. P. A. N. S. Philad. 1854.
Liberia; Calabar.

20. Onychophis punctata.

Onychophis punctata, Gray, Cat. 133.
Acontias punctatus, Leach; Bowdich, Ashantee.
Fantee (Bowdich).

21. Leiurus ornatus.

Leiurus ornatus, Gray, Cat. 157.
W. Africa.

22. Hemidactylus angulatus.

Hemidactylus angulatus, Hallowell, Proc. Acad. N. S. Phil. 1852,
63, fig. lips; 1857, 48.
W. Coast of Africa; Gaboon.

23. Hemidactylus formosus.

Hemidactylus formosus, Hallowell, P. A. N. S. Phil. 1856, 148.
W. Coast of Africa; Liberia.

24. Pachydactylus tristis.

Pachydactylus tristis, Hallowell, P. A. N. S. Philad. 1854, 98.
W. Africa.

25. Agama colonorum.

Agama colonorum, Daud.; Gray, Cat. 256.
Liberia.

26. Agama occipitalis.

Agama occipitalis, Gray, Phil. Mag. 1827, 214; Cat. 256.
W. Africa (Gray).

27. Chamæleo cristatus.

Chamæleo cristatus, Stutch.; Gray, Cat. 262.
Fernando Po.

28. Chamæleo vulgaris.

Chamæleo vulgaris, Daud.; Gray, Cat. 265.
Central Africa (Denham).

29. Chamæleo Senegalensis.

Chamæleo Senegalensis, Daud.; Gray, Cat. 266.
Senegal.

30. Chamæleo dilepis.

Chamæleo dilepis, Leach; Bowdich, Ashantee, 493; Gray, Cat.
266.

C. planiceps, Merrem.

Senegal; Gaboon; Ashantee; Fantee.

31. *Chamaeleo gracilis*.*Chamaeleo gracilis*, Hallowell, Journ. A. N. S. Philad. viii. t. 18.*C. dilepis*, ♀?

Liberia; Gaboon.

32. *Chamaeleo granulosus*.*Chamaeleo granulosus*, Hallowell, Proc. A. N. S. Phil. 1856, 147.

W. Africa.

33. *Chamaeleo Burchellii*.*Chamaeleo Burchellii*, Hallowell, P. A. N. S. Philad. 1856, 147.

Fernando Po.

34. *Chamaeleo Owenii*.*Chamaeleo Owenii*, Gray, Zool. Misc. 7. t. 4; Cat. 269.*Ch. tricornis*, Gray; Griffith, A. K.*Ch. Bibronii*, Martin, P. Z. S. 1828, 65.

Fernando Po.

35. *Leptophis smaragdina*.*Leptophis smaragdina*, Boie; Hallow. P. A. N. S. Philad. 1854, 100; 1857, 52.*Dendrophis smaragdina*, Schlegel.*Leptophis gracilis*, Hallow. l. c. ii. 60.

Liberia; Gaboon; S. Africa.

36. *Chrysopelea præornata*.*Chrysopelea præornata*, Günther, Cat.*Oxyrhopus præornatus*, Dum. & Bibr.*Dendrophis præornatus*, Schleg.

Senegal.

37. *Chlorophis heterodermus*.*Chlorophis heterodermus*, Hallow. P. A. N. S. Philad. 1857, 54.

Gaboon.

38. *Boædon quadrivittatus*.*Boædon quadrivittatus*, Hallow. P. A. N. S. Philad. 1857, 54.Isle de Los; Gaboon (*Hallow.*).**39. *Boædon quadrivirgatus*.***Boædon quadrivirgatus*, Hallow. P. A. N. S. Philad. 1857, 56.*Cælopetlis virgata*, Hallow. l. c. 1854, 98.

Liberia; Gaboon.

40. *Boædon niger*.*Boædon nigrum*, Fischer, l. c.

West Africa.

41. *Boædon lineatus*.*Boædon lineatus*, Dum. & Bibr. p. 363.

West Africa.

42. Boedon geometricus.

Boodon geometricus, Günther.
Lycodon geometricus, Schlegel.
 West Africa.

43. Boedon unicolor.

Lycodon unicolor, Schleg. p. 112.
Boedon unicolor, Dum. & Bibr. p. 359.
 Coast of Guinea.

44. Homonotus audax.

Homonotus audax, Hallow. P. A. N. S. Philad. 1857, 56.
 Gaboon.

45. Lycophidion laterale.

Lycophidion laterale, Hallow. P. A. N. S. Philad. 1857, 58.
 Gaboon.

46. Oxybelis Kirtlandii.

Oxybelis Kirtlandii, Hallow. P. A. N. S. Philad. 1857, 59.
Dryophis Kirtlandi, Hallow. l. c. 1854, 100.
Leptophis Kirtlandi, Hallow. l. c. ii. 62.
Oxybelis Lecomptei, Dum. & Bibr. Erp. Gen. vii. 821.
 Liberia ; Gaboon ; S. Africa.

47. Holuropholis olivaceus.

Holuropholis olivaceus, A. Dum. ; Revue et Mag. 1856, p. 466.
 West Africa.

48. Lycophidion Horstockii.

Lycodon Horstockii, Schleg.
Lycophidion Horstockii, Fitz.
 Angola.

49. Alopecion fasciatum.

Alopecion fasciatum, Günther.
 West Africa.

50. Metoporphina irrorata.

Coluber irroratus, Leach.
Hypsirhina maura, Gray.
Metoporphina irrorata, Günther.
 Ashantee.

51. Toxicodryas Blandingii.

Toxicodryas Blandingii, Hallow. P. A. N. S. Philad. 1857, 60.
Dipsas Blandingii, Hallow. l. c. ii. 170 ; 1854, 100.
 Liberia and Gaboon ; S. Africa.

52. Dendraspis Jamesonii.*Elaps Jamesonii*, Traill.*Dinophis Hammondii*, Hallowell, Journ. A. N. S. Philad. ii. 301.
229; 1852, 202; 1854, 100.*Leptophis viridis*, Hallowell, *l. c.* 1854, 100.
Liberia.**53. Dendraspis angusticeps.***Naja angusticeps*, A. Smith.*Dinophis angusticeps*, A. Duméril; Hallow. P. A. N. S. Philad.
1857, 72.
Gaboon.**54. Psammophis Philippseii.***Psammophis Philippseii*, Hallow. P. A. N. S. Philad. 1854, 100;
1857, 69.*Coluber Philippseii*, Hallow. *l. c.* ii. 169.
Liberia.**55. Psammophis.***Psammophis*, n. s., Hallow. P. A. N. S. Philad. 1857, 69.
Liberia.**56. Psammophis crucifer.***Psammophis crucifer*, Boie.*Coluber crucifer*, Merrem, t. 3.
W. Africa (*Raddon*).**57. Psammophis sibilans.***Coluber sibilans*, Linn.*Psammophis moniliger*, Boie.**58. Psammophis irregularis.***Psammophis irregularis*, Fischer.**59. Psammophis elegans.***Coluber elegans*, Shaw.*Macrosoma elegans*, Leach.Fantee (*Bowdich*).**60. Cœlopeltis lacertina.***Cœlopeltis lacertina*, Wagler.*Natrix lacertina*, Wagler.*Rhabdodon fuscus*, Heischmann.*Bothriophis distinctus*, Eichw.

W. Africa.

61. Hapsidophrys lineatus.*Hapsidophrys lineatus*, Fischer.*Dendrophis nigrolineatus*, Schlegel.W. Africa (*Raddon*).

62. Hapsidophrys caeruleus.*Hapsidophrys caeruleus*, Fischer.**63. Dipsas carinatus.***Dipsas carinatus*, Hallow. P. A. N. S. Philad. ii. 119.— ? *carinatus*, Hallow. l. c. 1857, 69.**64. Heteronotus triangularis.***Heteronotus triangularis*, Hallow. P. A. N. S. Phil. 1857, 68.*Coronella triangularis*, Hallow. l. c. 1854, 100.*Coluber laevis*, Hallow. l. c. ii. 118.

Liberia.

65. Dasypeltis scabra.*Dasypeltis scabra*, Wagler.*Coluber scaber*, Linn.

West Africa.

66. Dasypeltis palmarum.*Dasypeltis palmarum*, Günther.*Coluber palmarum*, Leach, Zaire, 408.*D. inornata*, A. Smith.

River Congo, Boma ; Old Calabar.

67. Ahætulla smaragdina.*Dendrophis smaragdinus*, Boie.*Leptophis smaragdinus*, Dum. & Bib.*L. gracilis*, Hallowell.

Ashantee ; Guinea.

68. Ahætulla irregularis.*Coluber irregularis*, Leach in Bowdich, Ashantee, p. 494.*Dendrophis Chenonii*, Reinh.*Leptophis Chenonii*, Dum. & Bib.*Dend. albobariata*, A. Smith, t. 63.*Ahætulla irregularis*, Günther, Cat.

Gambia ; Fantee ; Gold Coast.

69. Leptodeira hippocrepis.*Leptodeira hippocrepis*, Nob.*Dipsas hippocrepis*, Reinh.

Coast of Guinea.

70. Leptodeira rufescens.*Leptodeira rufescens*, Günther.*Coluber rufescens*, Gmelin.*Heterurus rufescens*, Dum. & Bib.

Ashantee ; Gambia.

71. Dipsas globiceps.*Dipsas globiceps*, Fischer.

West Africa.

72. *Dipsas fasciata*.

Dipsas fasciata, Fischer.
West Africa.

73. *Dipsas valida*.

Dipsas valida, Fischer, l. c.
Dipsas regalis, Gray, B.M.
Triglyphodon fuscum, Dum. & Bib.
Fantee and Guinea.

74. *Dipsas pulverulenta*.

Dipsas pulverulenta, Fischer.
Old Calabar.

75. *Dipsadoboa unicolor*.

Dipsadoboa unicolor, Günther, Cat.
W. Africa.

76. *Simocephalus poensis*.

Simocephalus poensis, Gray.
Heterolepis poensis, A. Smith.
H. bicarinatus, Schlegel.
W. Africa; Old Calabar.

77. *Thrasops flavigularis*.

Thrasops flavigularis, Hallow. P. A. N. S. Philad. 1857, 67.
Dendrophis flavigularis, Hallow. l. c. 1852, 205; 1857, 66.
Liberia; W. Africa; Gaboon.
Like *Bucephalus Capensis*, A. Smith.

78. *Bucephalus capensis*.

Bucephalus capensis, A. Smith.
Dispholides Lalandii, Duvernoy.
Dendrophis colubrina, Schlegel.
W. Africa.

79. *Coronella fuliginoides*.

Coronella fuliginoides, Günther, Cat. p. 39.
Old Calabar.

80. *Grayia silurophaga*.

Grayia silurophaga, Günther, Cat. p. 50.
West Africa.

81. *Zamenis cliffordii*.

Coluber cliffordii, Schlegel.
Periops parallelus, Dum. Bibr. p. 678.
West Africa.

82. *Meizodon regularis*.

Meizodon regularis, Fischer, Abhandl. Hamburg, 1856, p. 112.
West Africa.

83. Elapomorphus galvensis.

Elapomorphus galvensis, A. Duméril, Rev. Mag. 1858.
Gaboons.

84. Lamprophis modestus.

Lamprophis modestus, Dum. Bibr. p. 429.
Coast of Guinea.

85. Echis squamigera.

Echis squamigera, Hallow. P. A. N. S. Philad. 1854, 193.
Guinea; River Gaboon.

86. Causus rhombeatus.

Causus rhombeatus, Wagler; Gray, Cat. B.M. 33; Hallowell, P.
A. N. S. Philad. 1854, 101.
Naga rhombeatus, Schlegel.
Vipera V. nigrum, Cuvier.
Distichurus maculatus, Hallow. Journ. A. N. S. Philad. 8. t. 19.
W. Africa, Gold Coast (*Rich.*); Liberia; S. Africa.

87. Prosymna meleagris.

Prosymna meleagris, Gray, Cat. Snakes B.M. 80.
Calamaria meleagris, Reinh. K. Dansk. Sels. x. 1843, 238. t. 1.
f. 4-6, head.
Guinea (*Reinhardt*).

88. Naja haje?

Naja haje? var. *Melanoleuca*, Hallow. P. A. N. S. Philad. 1857,
61.
Gaboons.

89. Clotho nasicornis.

Clotho nasicornis, Gray, Snakes B.M. 25.
Coluber nasicornis, Shaw, Misc.
Vipera nasicornis, Daud.; Reinhardt.
Cerastes nasicornis, Wagner; Savage, P. A. N. S. Philad. 1848,
37.
Echidna nasicornis, Merrem; Hallow. P. A. N. S. Philad. 1847,
320. t. —; 1857, 62.
Vipera hexacera, Dum. & Bib. Erp. Gen. vii. 1416. t. 78. f. 2.
Var. *Echidna Gaboonica*, Dum. & Bib. Erp. Gen.; Hallow. l. c.
1857, 72.
Guinea; Liberia; Gaboon; Ashantee; S. Africa?

90. Clotho lateristriga.

Clotho lateristriga, Gray, Zool. Misc. 69; Cat. Snakes B.M. 26.
W. Africa; Gambia (*Randal*).

91. Atractaspis corpulentus.

Atractaspis corpulentus, Hallow. P. A. N. S. Philad. 1857, 70.
Brachycranion corpulentum, Hallow. l. c. 1854, 99.
Liberia.

92. *Hortulia Sebæ*.*Hortulia Sebæ*, Gray, Cat. Snakes B.M. 90.*Coluber Sebæ*, Gmelin.*Boa hieroglyphica*, Schneider.*Python bivittatus*, Smith.*Python Sebæ*, Dum. & Bib.Liberia (*Hallowell*); Ashantee; Gambia (*Whitfield*); Gold Coast (*Rick.*).**93. *Hortulia regia*.***Hortulia regia*, Gray, Cat. Snakes B.M. 90.*Boa regia*, Shaw.Minor, *Python Bellii*, Gray, Zool. Misc. 44.W. Africa; Gambia (*Whitfield*).**94. *Boa Liberiensis*.***Boa Liberiensis*, Hallowell, P. A. N. S. Philad. 1854, 100; 1857, 66.

Liberia.

" *Python Liberiensis*, Hallow. l. c. ii. 249, is a young *Epicrates cenchris* from S. America."—Hallow. l. c. 1857, 66.**95. *Eryx Reinhardtii*.***Eryx Reinhardtii*, Schlegel, Bijdr. Amst. 1851.

Gold Coast.

96. *Calabaria fusca*.*Calabaria fusca*, Gray, P. Z. S. 1858, Rept. pl. 14.Calabar (*Logan*); Fernando Po.**97. *Triglyphodon fuscum*.***Triglyphodon fuscum*, Dum. & Bib.; Hallow. P. A. N. S. Philad. 1857, 72.

Gaboon.

98. *Cæcilia rostrata*.*Cæcilia rostrata*, C.; Hallow. l. c. 1857, 72.

Gaboon.

99. *Rana subsigillata*.*Rana subsigillata*, A. D.; Hallow. l. c. 1857, 72.

Gaboon.

100. *Rana Bibronii*.*Rana Bibronii*, Hallow. l. c. 1857, 72.

Liberia.

101. *Rana galamensis*.*Rana galamensis*, Dum. Bibr. p. 367.

Senegal.

102. *Rana superciliaris*.

Rana superciliaris, Günther, Catal. B.M.
Sierra Leone.

103. *Lymanodytes albilabris*.

Lymanodytes albilabris, A. D.
Rana albilabris, Hallowell, l. c. 1856, 153.
W. Africa; Gaboon (*Hallow.*).

104. *Cystignathus senegalensis*.

Cystignathus senegalensis, Dum. Bibr. Erpét. Génér.
West Africa.

105. *Ixalus concolor*.

Ixalus concolor, Hallow. l. c. 1857, 72.
Liberia.

106. *Hyperolius ocellatus*.

Hyperolius ocellatus, Günther, Catal. B.M.
Fernando Po.

107. *Hyperolius plicatus*.

Hyperolius plicatus, Günther, Catal. B.M.
Coast of Guinea.

108. *Hyperolius marmoratus*.

Hyperolius marmoratus, Rapp. Erichson's Arch. 1842.
West Africa.

109. *Hyperolius viridiflavus*.

Hyperolius viridiflavus, Dum. Bibr. Erpét. Génér.
Senegal.

110. *Hyla Aubryi*.

Hyla Aubryi, A. D.; Hallow. l. c. 1857, 72.
Gaboon.

111. *Hyla punctata*.

Hyla punctata, Hallowell, P. A. N. S. Philad. 1854, 193; 1857,
65.
Guinea; River Gaboon.

112. *Heteroglossa Africana*.

Heteroglossa Africana, Hallow. l. c. 1857, 64.
Gaboon.

113. *Bufo maculatus*.

Bufo maculatus, Hallow. l. c. 1854, 101.
Bufo cinereus, Hallow. l. c. ii. 169.
Liberia.

114. *Bufo tuberosus*.

Bufo tuberosus, Günther, Catal. B.M.
Fernando Po.

115. *Bufo guineensis*.

Bufo guineensis, Mus. Lugd. Bat. ; Günther, Catal. B.M.
Fernando Po ; Sierra Leone.

116. *Bufo pantherinus*.

Bufo pantherinus, Boie, Mus. Lugd. Bat. ; Dum. Bibr. Erp. Gén.
Bufo arabicus, Rüppell, Atlas.
Gambia.

117. *Dactylethra laevis*.

Bufo laevis, Daud. Hist. Rain.
Pipa laevis, Merr. Tent.
Dactylethra capensis, Cuv. Règne Anim.
Dactylethra laevis, Günther, Catal. B.M.
West Africa.

118. *Dactylethra Mülleri*.

Dactylethra Mülleri, Peters ; Hallow. l. c. 1857, 65.
Gaboon.

119. *Testudo sulcata*.

Testudo sulcata, Müller ; Gray, Cat. B.M. 7.
T. radiata Senegalensis, Gray, Syn. R. 11.
T. Schoepfi, Rüppell.
Senegal †

120. *Kinyxis erosa*.

Kinyxis erosa, Gray, Syn. 16 ; Cat. B.M. 13.
K. castanea, Bell.
Testudo denticulata, Shaw.
T. erosa, Schw.
Cinixis denticulata, Hallow. l. c. 1857, 71, 72.
Liberia and Gaboon.

121. *Kinyxis Belliana*.

Kinyxis Belliana, Gray, Syn. 69 ; Cat. B.M. 12.
K. shoensis, Rüppell, Mus. Senk.
Gambia (*Whitfield*).

122. *Kinyxis Homeana*.

Kinyxis Homeana, Gray, Cat. B.M. 11.
Cinixis Homeana, Hallow. l. c. 1857, 72.
Gaboon ; Cape Coast Castle (*Friend*).

123. *Emys laticeps*.

Emys laticeps, Gray, Proc. Zool. Soc. 1853 ; Catal. Testud. B.M.
23. t. 9.
West Africa ; Gambia (*Castany*).

124. *Pentonyx Gambonensis*.

Pentonyx Gambonensis, Aug ; Dum. Rev. & Mag. Zool. 1856, 373.
Gaboon.

125. *Stenotherus Derbianus*.

Stenotherus Derbianus, Gray, Cat. B.M. 37; Testud. B.M.
Gambia (*Whitfield*); Sierra Leone.

126. *Emyda Senegalensis*.

Emyda Senegalensis, Gray, Cat. Tort. B.M. 47.
Cryptopus Senegalensis, Dum. & Bib. ii. 504.
Senegal?; Mus. Paris.

127. *Emyda Aubryi*.

Cryptopodus Aubryi, Dum. & Bib. Rev. & Mag. Zool. 1856, t. 10.
Gaboon.

128 *Cyclanosteus Petersii*.

Cyclanosteus Petersii, Gray, Proc. Zool. Soc. 1853; Cat. Testud.
B.M. 64. t. 29.

West Africa; Gambia (*Whitfield*).
See *C. frenatus*, Peters, Mozambique.

129. *Trionyx Mortoni*.

Trionyx Mortoni, Hallowell.
Liberia.

130. *Tyrsee Niloticus*.

Tyrsee Niloticus, Gray, Cat. B.M. 48.
Trionyx Aegyptiacus, Geoff.
T. labiatus, Bell.
Gaboon.

131. *Tyrse argus*.

Tyrse argus, Gray, Cat. B.M. 48; Testud. B.M.; Knowles,
Menag. t.
W. Africa; Gambia (*Whitfield*).

132. *Phractogonus galeatus*.

Phractogonus galeatus, Hallow. l. c. 62. fig. ; 1857, 50.
Liberia.

133. *Mecistops Bennettii*.

Mecistops Bennettii, Gray, Cat. B.M. 57.
Crocodilus leptorhynchus, Bennett.
Kbinh, Savage, P. A. N. S. Philad. 1848, 37.
W. Africa; Gambia (*Kendal*); Gaboon (*Savage*).

134. *Mecistops cataphractus*.

Mecistops cataphractus, Gray, Cat. B.M. 58.
Crocodilus cataphractus, Cuvier.
W. Africa; Sierra Leone.
Same as the former.

Dr. Günther has kindly added general synonyma to the above list.

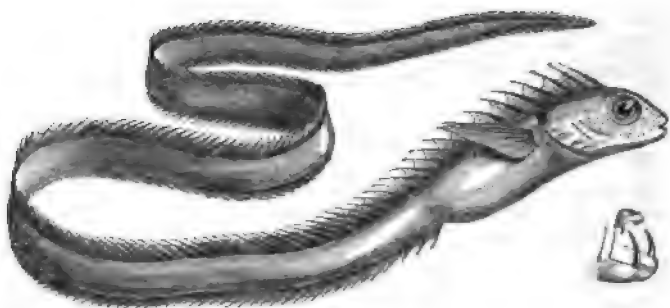
4. ON NEMOPHIS, A NEW GENUS OF RIBBAND-SHAPED FISHES.
By DR. J. KAUP.

In the collection at the Museum of Natural History in Paris I found, some years ago, when I was describing the order of Eels, this interesting genus, in which the form and function of the canine teeth are extremely remarkable.

Two specimens of this rare fish were received at the Museum, from MM. Lesson and Garnot, without any note : as they were obtained in the expedition of M. Duperrey, I presume they were captured in the South Sea.

One of the specimens being in a half-spoiled condition, I was enabled, but in this specimen only, to observe the paradoxical arrangement and formation of the canine teeth.

After the smallness of the mouth, no one would have expected to find at the end of the small incisors such large slightly-curved canine teeth in the lower jaw. These canine teeth pass through a canal in the flesh round the eye, and have an opening near the eye. These teeth, which cannot be used as true canine teeth on account of the smallness of the mouth, have certainly only the function of fixing and giving the lower jaw a certain direction.



I call this paradoxical form

NEMOPHIS.

Without ventral fins. Mouth small ; upper and lower jaw with minute incisors. Small canine teeth in the upper jaw, longer and curved ones in the lower jaw, which are placed, when the mouth is closed, in a canal going round the eyes and opened on the surface near the eyes. Eyes large. Cavity of the gills with a small round opening placed very high. The dorsal fin commences near the eyes, and is connected with the caudal and anal as in the Eels. Pectoral fin developed. Anus at the end of the first eighth of the total length.

NEMOPHIS LESSONI, Kp.

It has a length of 255 mm. or 9 Par. inches. Colour silver-white, with black points on the head and end of the tail. Dorsal and anal fins blackish.

Diameter of the eye 5, length of the head to the gill-opening 15, from the muzzle to the anus 32 millimetres.

This genus forms a distinct group among the Riband-shaped Fishes, and is perhaps the type of a different family, which we may call *Nemophidæ*.

5. A LIST OF THE BIRDS, WITH DESCRIPTIONS OF NEW SPECIES OBTAINED BY MR. ALFRED R. WALLACE IN THE ARU AND KÉ ISLANDS. BY GEORGE ROBERT GRAY, F.L. & Z.S., ETC.

(Aves, Pl. CXXXIII.—CXXXVIII.)

The birds herein mentioned were collected by Mr. Wallace in the Aru Islands, with the exception of a few which were obtained by him in the Ké Islands near the coast of New Guinea. The list consists of 119 species—a number which shows great perseverance and energy on the part of Mr. Wallace; many of them are new and highly interesting, while others exhibit the sexes, which were previously unknown. The 'Annals of Natural History' for the present year contain an account by Mr. Wallace of the islands on which these birds were found; and he subjoins interesting remarks on the habits of several of the birds herein described and noticed. In the December number of last year he gave an account of the habits of the Great Bird of Paradise of Aru. Both these publications are well worthy of the perusal of the naturalist.

I have added a Table of New Guinea Birds, at the same time noticing those found on the northern portion of Australia, and on the islands situated between the two.

FALCONIDÆ.

1. CUNCUMA LEUCOGASTER.

Falco leucogaster, Gm. S. N. i. p. 257.

Haliaetus leucogaster, Gould, B. of Austr. pl. 3.

Cuncuma leucogaster, G. R. Gray, List of Accip. p. 24.

Hab. Aru Islands. In Mr. Wallace's Collection.

2. HALIASTUR LEUCOSTERNUS, var.

Haliaetus girrenera, Vieill.; Less. Voy. Coqu. Zool. p. 615.

Haliaetus leucosternus, Gould, B. of Austr. pl. 4.

Haliastur leucosternus, G. R. Gr. List of B. B.M. i. p. 13.

Length 17"; wings 13" 3".

Hab. Aru Islands. ♂ in Mr. Wallace's Collection.

3. BAZA STENOZONA.

Allied to *Baza subcristata*, but is smaller in all its proportions, except in the bill, which is of the same size; the bands on the under

part are narrower, and the rusty colour beneath the body and under wing-coverts is much paler; the bands on the tail are nearer together, while the one at the tip is broader: the outer feather on each side differs by being obliquely truncated.

Length 17" 3"; wings 11" 9".

Hab. Aru Islands. ♀ in Mr. Wallace's Collection.

4. ACCIPITER POLIOCEPHALUS.

♀. Head, back of neck and nape grey; entire back, wing-coverts and tail above, plumbeous, the latter with narrow bars of black; quills fuscous black; beneath the body white; cere and legs red; bill and claws black.

Length 14" 9"; wings 8" 6".

Hab. Aru Islands. ♀ in Mr. Wallace's Collection.

STRIGIDÆ.

The collection does not contain a single example of this family; in fact only two, the *Athene humeralis*, Homb. and Jacq. Voy. Pôle Sud, t. 4, f. 1, and *A. theomacha*, Bp., have yet been recorded as coming from New Guinea.

CAPRIMULGIDÆ.

5. PODARGUS OCELLATUS.

Podargus ocellatus, Quoy & Gaim. Voy. Astrol. t. 14, ♂.

♀. Length 13" 9"; wings 7" 2".

Hab. Aru Islands. ♀ in Mr. Wallace's Collection.

6. CAPRIMULGUS MACRURUS.

Caprimulgus macrurus, Horsf.; Gould, B. of Austr. ii. pl. 9.

Hab. Aru Islands. ♂ in the British Museum.

HIRUNDINIDÆ.

7. MACROPTERYX MYSTACEUS.

Cypselus mystaceus, Less. Voy. Coqu. t. 22.

Hab. Aru Islands. ♂ ♀ in British Museum.

8. COLLOCALIA HYPOLEUCA.

Closely allied to *Collocalia Linchi*, Horsf., but is rather larger; with the upper surface of a glossy green-black; side of head, throat and breast fuscous black, the two latter with the feathers margined with pure white; abdomen pure white; under tail-coverts glossy green-black.

♀. Length 4"; wings 4".

Hab. Aru Islands. ♀ in Mr. Wallace's Collection.

Collocalia nidifica, var.

Differs in being rather whiter beneath the body, especially on the throat.

Hirundo nidifica, G. R. Gr.

Hirundo fuciphaga, Thunb.

Hirundo esculenta, var., Lath. Syn. Suppl. pl. 135.

Hirundo brevirostris, McClell.

Hab. Chaumont Isle ; Louisiade Archipelago. ♂ in British Museum.

9. *HIRUNDO NIGRICANS*.

Hirundo nigricans, Vieill. N. Dict. H. N. xiv. p. 523 ; Voy. Astrol. t. 12. f. 2.

Collocalia arborea, Gould, B. of Austr. ii. pl. 14.

Hab. Aru Islands. ♂ in British Museum.

CORACIADÆ.

10. *EURYSTOMUS PACIFICUS*.

Coracias pacifica, Lath. Ind. Orn. Suppl. p. xxvii.

Eurystomus orientalis (L.), Vig. & Horsf.

Eurystomus australis, Sw. ; Gould, B. of Austr. ii. pl. 17.

Eurystomus pacificus, G. R. Gr.

Hab. Aru Islands. ♂ in British Museum.

ALCEDINIDÆ.

11. *DACELO GAUDICHAUDI*.

Alcedo Gaudichaudi, Quoy & Gaim. Voy. Uranie, t. 21.

Chamaeleon Gaudichaudi, Less.

Dacelo Gaudichaudi, G. R. Gr.

Hab. Aru Islands. ♂ ♀ in British Museum.

12. *DACELO TYRO*. (Pl. CXXXIII.)

♂. Top, sides of head and back of neck black, spotted and banded with fulvous white ; nape and upper part of back fulvous-white, banded and margined with black ; scapulars black ; wing-coverts black, broadly margined with shining blue ; quills and tail black, margined outerly with dull blue ; back black, and lower part of back glossy silvery blue ; beneath the body pale fulvous, lighter on throat. Upper mandible black, and lower pale horn-colour.

♀. Quills and tail greenish blue.

Length 13" ; wings 5½".

Juv. Beneath with each feather margined with black ; bill black, tipped with pale horn-colour ; otherwise the same.

Hab. Aru Islands. ♂ ♀ in British Museum.

13. *HALCYON COLLARIS*.

Alcedo collaris, Scop. Del. Flor. et Faun. Insubr. p. 90.

Halcyon collaris, Sw. Zool. Illustr. pl. 27.

Hab. Aru Islands. ♂ in Mr. Wallace's Collection.

14. *HALCYON SORDIDA*, var.

Rather larger in all its dimensions: length 10", wings 4" 2", bill from gape 2" 5"; but the colour of the back and rump are brighter than in *Halcyon sordidus*, Gould, B. of Austr. ii. pl. 23.

Hab. Aru Islands. ♂ in British Museum.

The Hope Isles' specimens measured, length 10", wings 4" 6", bill from gape 2" 9"; while a specimen from Louisiade Archipelago is of the length of 8" 6", wings 3" 9", and bill from gape 2" 1", which is about the same size as *H. sordidus*, Gould, but is rather brighter in its colours, and agrees best with the Aru specimen.

15. *HALCYON SANCTA*.

Halcyon sancta, Vig. & Horsf.

Dacelo chlorocephalus, var. β, Less.

Hab. Aru Islands. ♀ in British Museum.

16. *TANYSIPTERA HYDROCHARIS*.

Top of head blue; eyebrows silvery blue; cheeks, ear-coverts and nape black; back and wings deep blue; rump and beneath the body white; middle tail-feathers silvery blue, margined at base, and the tips white; lateral tail-feathers black, margined outerly with deep blue. Bill red, and feet fuscous.

Length to end of middle tail-feathers 13"; wings 3" 8".

Juv. Rufous brown; beneath fulvous; feathers more or less margined with rufous brown.

Hab. Aru Islands. ♂ ♀ and juv. in British Museum.

17. *SYMA TOROTORO*.

Syma torotoro, Less. Voy. Coqu. t. 31 bis. f. 1.

Hab. Aru Islands. ♂ in Mr. Wallace's Collection.

Only differs from *S. flavirostris*, Gould, B. of Austr. Suppl. pl. , in *not* having any black on the culmen near the tip.

18. *CEYX PUSILLA*.

Ceyx pusilla, Temm. Pl. Col. 595. f. 3; Gould, B. of Austr. ii. pl. 26.

Hab. Aru Islands. ♂ in British Museum.

19. *CEYX SOLITARIA*.

Ceyx solitaria, Temm. Pl. Col. 595. f. 2.

Therosa solitaria, Müll.

Ceyx Meninting, Less. Voy. Coqu. Zool. i. p. 691.

Hab. Aru Islands. ♀ in Mr. Wallace's Collection.

20. *ALCYONE AZUREA*, var.

Ceyx azurea, Less. Voy. Coqu. Zool. i. p. 690.

Alcyone azurea, var., Gould, B. of Austr. Introd. p. xxxi.

Alcyone pulchra, Gould, Proc. Z. S. xiv. p. 19.

Ceyx Lessonii, Cass. Journ. Acad. Philad. 1850, p. 69.

Hab. Aru Islands. ♂ in Mr. Wallace's Collection.

PROMEROPIDÆ.

21. NECTARINIA FRENATA.

Nectarinia frenata, Müll. Verh. Nat. Gesch. p. 61. t. 8. f. 1.

Nectarinia australis, Gould, B. of Austr. Suppl. pl.

Hab. Aru Islands. ♂ ♀ in British Museum.

22. NECTARINIA ASPASIA.

Cinnyris aspasia, Less. Voy. Coqu. t. 30. f. 4.

Cinnyris sericea, Less. Dict. Sci. Nat. iv. p. 21.

Nectarinia aspasia, Müll. Verh. Nat. Gesch. p. 58.

Hab. Aru Islands. ♂ in Mr. Wallace's Collection.

23. NECTARINIA ZENOBIA.

Cinnyris zenobia, Less. Voy. Coqu. t. 30. f. 3.

Cinnyris Clementia, Less. Dict. Sci. Nat.

Hab. Ké Islands. ♂ in Mr. Wallace's Collection.

24. ARACHNOTHERA NOVÆ GUINEÆ.

Cinnyris novæ guineæ, Less. Voy. Coqu. Zool. i. p. 677.

Arachnothera novæ guineæ, Müll. Verh. Nat. Gesch. t. 11. f. 3.

Hab. Aru Islands. ♂ ♀ in British Museum.

25. DICAÛM IGNICOLLE.

♂. Glossy blue-black; under surface olive; middle of abdomen yellowish white; middle of throat, upper part of breast, and under tail-feathers vermilion-red, the latter mixed with vermilion-white; under wing-coverts white.

♂ juv. ? Olive; wings and tail fuscous black; middle of throat, breast and abdomen yellowish white, with the sides pale olive; under tail-feathers tinged with vermilion.

Length 3" 9^h; wings 2" 2^h.

Hab. Aru Islands. ♂ ♀ in British Museum.

Close upon *D. hirundinaceum*, but the throat and part of breast are vermilion-red, &c.

26. PRIONICHILUS NIGER.

Dicaeum nigrum, Less. Cent. de Zool. t. 27.

Hab. Aru Islands. ♂ ♀ in British Museum.

MELIPHAGIDÆ.

27. MYZOMELA NIGRITA.

♂. Entirely shining deep black.

♀. Olive-brown, with the front and throat tinged with crimson.

Length 5" 6^h; wings 2" 3^h.

Hab. Aru Islands. ♂ ♀ in British Museum.

28. MYZOMELA ERYTHROCEPHALA.

Myzomela erythrocephala, Gould, B. of Austr. iv. pl. 64.

Hab. Aru Islands. ♂ ♀ in British Museum.

29. GLYCIPHILA MODESTA.

♀. Brown, with dashes of dark brown on the feathers; beneath the body white, with some pale-plumbeous dashes on the sides; feathers of the breast pale brown, margined broadly with white.

Length 5" 3"; wings 2" 6".

Hab. Aru Islands. ♀ in Mr. Wallace's Collection.

A specimen is contained in British Museum from Goold's Island.

30. GLYCIPHILA OCULARIS.

Glyciphila ocularis, Gould, B. of Austr. iv. pl. 31.

Hab. Aru Islands. ♂ in British Museum.

31. PTILOTIS FILIGERA.

Ptilotis filigera, Gould, B. of Austr. Suppl. pl.

Hab. Aru Islands. ♂ ♀ in British Museum.

32. PTILOTIS SIMILIS.

Ptilotis similis, Homb. & Jacq. Voy. Pôle Sud, t. 17. f. 2, 3.

Hab. Aru Islands. ♂ ♀ in British Museum.

33. PTILOTIS MEGARHYNCHUS.

♂. Brown; top of head olive, with dashes of black in the middle of each feather; eyes surrounded with yellow; throat yellowish white, with minute dashes of fuscous; breast and upper part of abdomen fuscous, margined with yellowish olive; sides, abdomen and under tail-coverts rufous brown; under wing-coverts rufous white.

Length 8"; wings 3" 6"; bill 1" 1".

Hab. Aru Islands. ♂ in Mr. Wallace's Collection.

34. TROPIDORHYNCHUS NOVÆ GUINÆÆ.

Tropidorhynchus novæ guineæ, Müll. Verh. Nat. Gesch. p. 153.

Hab. Aru Islands. ♂ ♀ in British Museum.

35. TROPIDORHYNCHUS PLUMIGENIS.

♀. Differs from the former by wanting the knob on the basal part of culmen, and by the sides of the head, beneath the eyes being plumed; the ends of the tail-feathers are margined with brownish white.

♂ juv. Blackish brown; feathers round the base of neck margined with yellow or white. Probably a younger bird than the female.

Hab. Ké Island. ♂ ♀ in Mr. Wallace's Collection.

LUSCINIDÆ.

36. GERYGONE CHRYSOGASTER.

Olive-brown; stripe from nostrils to eyes, ear-coverts, and sides of neck pale brown; throat and breast white; abdomen and under tail-coverts pale yellow. Bill and feet dusky.

Length 4" 3"; wings 2" 1".

Hab. Aru Islands. ♂ ♀ in British Museum.

37. *ZOSTEROPS CITRINELLA*.*Zosterops citrinella*, Müll. Bp. Consp. Av. p. 398.*Hab.* Ké Island. ♂ in Mr. Wallace's Collection.*Zosterops griseotincta*.

Yellowish green; line from each nostril and round each eye white; quills fuscous black, margined with grey and yellowish green, especially on the tertials. Tail fuscous, tinged with yellowish green; under surface pale yellow, sides tinged with green and grey.

Length 4" 7^{'''}; wings 2" 6^{'''}.*Hab.* Louisiade Archipelago. ♂ in British Museum.

Allied to *Z. luteus*, Gould (B. of Austr. iv. pl. 83); but not so rich in colour, being in places tinged with grey.

TURDIDÆ.

38. *ALCIPPE MONACHA*.

Castaneous black; top of head black; under surface white, with the sides of breast and abdomen obscure brown.

Upper mandible black, and lower one white; feet pale horn-colour.

Length 4" 7^{'''}; wings 2" 5^{'''}.*Hab.* Aru Islands. ♀ in British Museum.39. *PITTA NOVÆ GUINÆÆ*.*Pitta atricapilla*, Quoy & Gaim. Voy. Astrol. t. 8. f. 3.*Pitta novæ guinææ*, Schleg.*Brachyurus novæ guinææ*, Bp. Consp. Av. p. 256.*Hab.* Aru Islands. ♂ ♀ in British Museum.40. *PITTA MACKLOTI*.*Pitta mackloti*, Temm. Pl. Col. 547.*Brachyurus mackloti*, Bp. Consp. Av. p. 255.*Hab.* Aru Islands. ♂ ♀ in British Museum.41. *ORIOLOUS MÜLLERI*.*Mimeta mülleri*, Bp. Consp. Av. p. 346.*Hab.* Aru Islands. ♂, ♀, juv. in British Museum.

MUSCICAPIDÆ.

42. *RHIPIDURA ATRIPENNIS*.

Closely allied to *R. mimoides*, Müll. MSS., but the black is altogether of a deeper hue, while the wings are of a decided black. These differences may be occasioned by the specimens from Aru being more matured.

Length 8" 9^{'''}; wings 4".*Hab.* Aru Islands. ♂ ♀ in British Museum.

43. RHIPIDURA MACULIPECTUS.

♂. Deep black; with a line from nostrils passing above the eyes, and a broad line proceeding from the base of the bill on each side of the throat, the tips of the feathers of breast, of tail, of the upper and under wing-coverts, white.

♀. Brownish black; but similarly marked in other respects with white; upper mandible and feet black, lower white.

Length 8" 8^{'''}; wings 3" 2^{'''}.

Hab. Aru Islands. ♂ ♀ in British Museum.

44. RHIPIDURA HYPERYTHRA.

Plumbeous; head and throat black; quills and tail fuscous black, margined with plumbeous; spot at the base of lower mandible, which advances into two lines, one on each side of the throat, and the tips of the wing-coverts and tail feathers white; breast and abdomen rusty red; bill black, lower mandible yellow; and feet dusky olive.

Length 6" 3^{'''}; wings 2" 9^{'''}.

Hab. Aru Islands. ♂ ? in Mr. Wallace's Collection.

This may be the *R. rufiventris*, Müll. ?

45. RHIPIDURA ASSIMILIS.

Closely allied to *R. isura*, Gould (B. of Austr. ii. pl. 85), but is rather larger, with the breast paler; under wing-coverts buffy white, and the outer tail-feather with less white than in the Australian specimens.

Hab. Ké Island. ♂ in British Museum.

46. MACHÆRIRHYNCHUS XANTHOGENYS.

Differs from *M. flaviventris*, Gould. B. of Austr. Suppl. pl. , by having a rather larger bill, by the back being less green, and the ear-coverts being yellow instead of black.

Length 5" 3^{'''}; wings 2" 4^{'''}.

Hab. Aru Islands. ♂ in British Museum.

47. MYIAGRA LATIROSTRIS.

Myiagra latirostris, Gould, B. of Austr. ii. pl. 92.

Hab. Aru Islands. ♂ ♀ in British Museum.

Myiagra lucida.

♂. Black, with the feathers broadly margined with glossy green; quills fuscous black.

Length 7" 3^{'''}; wings 3" 9^{'''}.

Hab. Louisiade Archipelago. ♂ in British Museum.

48. PIEZORHYNCHUS RUFOLATERALIS.

Very like *Piezorhynchus nitidus* ♀, Gould (B. of Austr. ii. pl. 88.), but the bill is shorter and rather broader at base, which is also furnished with longer and stronger bristles. The sides, under wing-

coverts and under tail-coverts, pale rusty red ; the under surface is also tinged with rusty red.

Length 6" 9''' ; wings 3" 4'''.

Hab. Aru Islands. ♂ ♀ in British Museum.

49. *TODOPSIS CYANOCEPHALA.* (Pl. CXXXIV.)

♂. Indigo-blue ; front and sides of head deep black ; quills and tail black, the latter and tertials margined with blue ; beneath, the body deep blue ; the tips of the tail slightly margined with white.

♀. *Todus cyanocephalus*, Quoy & Gaim. Voy. Astrol. t. 5. f. 4.

Philentoma cyanocephala, Pucher. Voy. Pôle Sud, t. 20. f. 2.

Length 6" ; wings 2" 3'''.

Hab. Aru Islands. ♀ ♂ in British Museum.

50. *MONARCHA TELESCOPHTHALMA.*

♂. *Muscicapa telescopthalmus*, Garn. Voy. Coq. t. 18. f. 1.

Monarcha telescopthalmus, Sw. Classif. of B. ii. p. 257.

Arses telescopthalmus, Less. Tr. d'Orn. p. 387.

♀ or juv. *Muscicapa Enado*, Less. Voy. Coqu. t. 15. f. 2.

Hab. Aru Islands. ♂ ♀ in British Museum.

51. *MONARCHA CHRYSOMELA.*

♂. *Muscicapa chrysomela*, Garn. Voy. Coqu. t. 18. f. 2.

Monarcha chrysomela, Sw.

Arses chrysomelas, Less. Tr. d'Orn. p. 387.

♀. Yellowish olive, feathers on the head narrowly margined with fuscous ; wings and tail fuscous, margined with yellowish olive ; throat, breast and sides obscure yellow ; abdomen and under tail-coverts deep yellow ; spot under each eye pure white.

Hab. Aru Islands. ♂ ♀ in British Museum.

52. *MONARCHA INORNATA.*

Muscicapa inornata, Garn. Voy. Coqu. t. 16. f. 1.

Hab. Aru Islands. ♂ ♀ in British Museum.

53. *MONARCHA GUTTULA.*

♂. *Muscicapa guttula*, Garn. Voy. Coqu. t. 16. f. 2.

Monarcha guttula, G. R. Gray, Gen. of B. i. p. 260.

Hab. Aru Islands. ♂ in British Museum.

54. *MONARCHA GRISEOGULARIS.*

♂. Plumbeous ; quills fuscous, slightly margined with grey ; some of the tail-coverts and tail deep black ; throat plumbeous ; ear-coverts and line under each eye black ; a line from behind the eye and ending in a spot behind the ear-coverts, abdomen, under tail-coverts and the tips of the three outer tail-feathers, white ; breast mottled with white and pale rust-colour.

Length 6" 9''' ; wings 3" .

Hab. Aru Islands. ♂ in British Museum.

55. *MONARCHA LEUCURA*.

♂. Shining deep black; breast, abdomen and the four outer tail-feathers pure white, with the base of the latter more or less black.

♂ juv. Olivaceous plumbeous; top of head greyish plumbeous; middle tail-feathers deep black, the three outer feathers mostly pure white, with the base black; the fourth outer feather black, with white down the shaft and at the tip; chin greyish plumbeous, with a white streak down each feather.

Length 6" 3"; wings 3" 1".

Hab. Ké Island. ♂ in British Museum. (♂ ♀ in Mr. Wallace's Collection.)

Monarcha melanoptera.

Closely allied to *M. trivirgata*, Temm. (Gould, B. of Austr. ii. pl. 96), but the black on the forehead, over the eyes and ear-coverts, is posteriorly bordered with white; the wing-coverts deep black.

Length 6"; wings 3" 3".

Hab. Louisiade Archipelago. In British Museum.

The Museum also possesses a specimen of *M. leucotis*, Gould (B. of Austr. Suppl. pl.), from the same place; while that of Mr. Gould's figure was from Cape York, Australia, and is now deposited in the British Museum.

56. *MICROECA ? FLAVOVIRESCENS*.

Yellowish green; lore white; wings and tail fuscous, margined with yellowish green; round the eyes and middle of throat, breast, and abdomen yellow; sides pale yellowish green; under tail-coverts yellowish white. Bill dusky; lower mandible and feet yellow.

Length 5" 4"; wings 2" 11".

Hab. Aru Islands. ♂ ♀ in British Museum.

AMPELIDÆ.

57. *PACHYCEPHALA GRISEICEPS*.

Olive brown, tinged with grey on the top of head; line from nostrils extending over each eye; throat and breast white, tinged with brown; abdomen and under tail-coverts whitish yellow; wings and tail fuscous, margined with olive.

Length 6"; wings 3" 3".

Hab. Aru Islands. ♂ in British Museum.

58. *PACHYCEPHALA RUFIPENNIS*.

Olive brown; line from nostril, extending partly over the eye and throat, brownish white; breast pale rusty brown mixed with white; abdomen white, tinged with yellow; tertials margined with reddish castaneous.

Length 6" 6"; wings 3" 3".

Hab. Ké Island. ♀ in British Museum.

59. *PACHYCEPHALA*? *MONACHA*.

♂. Head, neck and breast deep black; back, wings and tail fuscons black; abdomen and under tail-coverts white; bill and feet black.

Length 6" 6^{'''}; wings 3" 6^{'''}.

Hab. Aru Islands. ♂ in British Museum.

60. *CAMPEPHAGA CÆRULEOGRISEA*.

Closely allied to *Ceblephyrus plumbea*, Müll., but is larger, and without the rusty yellow on the under-coverts of the tail.

Length 14" 3^{'''}; wings 6" 9^{'''}.

Hab. Aru Islands. ♀ in Mr. Wallace's Collection.

61. *CAMPEPHAGA MELANOPS*.

Corvus melanops, Lath.?

Campephaga melanops, G. R. Gray; Gould, B. of Austr. ii. pl. 55.

Graucalus melanotis, Gould.

Hab. Aru Islands. ♀ in British Museum.

62. *CAMPEPHAGA POLYGRAMMICA*.

Closely allied to *Lalage rustroventris* (Puch.), but is more numerous banded on the under surface, which is also of a deeper rusty colour, and there is less white on the wings and at the ends of the tail-feathers.

Hab. Aru Islands. ♀ in British Museum.

63. *CAMPEPHAGA HYPOLEUCA*.

Graucalus hypoleucus, Gould, B. of Austr. ii. pl. 57.

Hab. Aru Islands. ♂ ♀ in Mr. Wallace's Collection.

64. *ARTAMUS PAPUENSIS*.

Ocypterus papuensis, Temm.; Bp. Consp. Av. p. 344.

Ocypterus leucorhynchus, Müll. Verh. Nat. Gesch. p. 21.

Hab. Aru Islands. ♂ in the British Museum.

65. *DICRURUS ASSIMILIS*.

Closely allied to *Dicrurus bracteatus*, Gould (B. of Austr. ii. pl. 82), but is smaller in all its proportions.

Length 10" 6^{'''}; wings 5" 4^{'''}.

Hab. Aru Islands. ♂ ♀ in British Museum.

66. *DICRURUS MEGALORNIS*.

Very similar in colouring to the *Dicrurus bracteatus*, but is very much larger in all its proportions.

Length 15"; wings 7" 1^{'''}.

Hab. Ké Island. In Mr. Wallace's Collection.

LANIIDÆ.

67. *RECTES DICHROUS*.

Rectes dichrous, Bp. Compt. Rend. xxxi. p. 563.

Hab. Aru Islands. ♂ ♀ in British Museum.

68. RECTES STREPITANS.

Rectes strepitans, Jacq. & Puch. Voy. Pôle Sud, t. 6. f. 1.

Rectes ferrugineus, Bp. Compt. Rend. xxxi. p. 563.

Hab. Aru Islands. ♂ ♀ in British Museum.

69. MYIOLESTES ARUENSIS.

Differs from the *M. megarhynchus* by being of an obscure olive-colour, darker on the head; the outer webs of quills greyish brown; and the under surface pale rusty colour, with the throat more inclined to white.

Length 7" 3"; wings 3" 4".

♀ similar to the ♂, but with the greater wing-coverts and tertials deep rusty brown.

Hab. Aru Islands. ♀ in British Museum. ♂ in Mr. Wallace's Collection.

Myiolestes Gouldii.

Allied to *M. megarhynchus*, but is of a greyish olive, with deep rusty colour on the greater wing-coverts and outer margins of quills; chin white, with a brown line down the shaft of each feather; a small rusty spot behind each eye. This mark points out at once this species from the others.

Hab. Brown's River, Australia; and Barnard Isles. In British Museum.

Myiolestes griseatus.

Differs from the others by being decidedly greyish olive on the upper surface, and by not having any rusty colour on the wings; the under surface rusty white, which becomes white on the throat.

Hab. Cape York, Australia; and Dunk's Island. In British Museum.

70. CRACTICUS PERSONATUS.

Coracias varians, Gmel.?

Cracticus personatus, Temm. MSS.?

Hab. Aru Islands. ♂ ♀ juv. in British Museum.

These specimens differ from *C. varians* in having the black extending further on the breast, and in having more white at the tips of the outer tail-feathers.

71. CRACTICUS QUOYI.

Barita Quoyi, Less. Voy. Coqu. t. 14.

Cracticus Quoyi, G. R. Gray, Gen. of B. App. p. 14.

Hab. Aru Islands. ♂ ♀ in British Museum.

CORVIDÆ.

72. CORVUS ORRU.

Corvus macrorhynchus, pt., Wagl.?

Corvus orru, Müll.; Bp. Consp. Av. p. 385.

"Iris sky-blue" (*Wallace*).

Hab. Aru Islands. ♂ ♀ in British Museum.

PARADISEADÆ.

73. PARADISEA APODA.

Var. *Wallaciana*.

The "intensely shining orange-coloured" lateral plumes easily distinguish this bird from the specimens of *P. apoda* in the British Museum, and from the representations given in the works of Levaillant, Vieillot, and Lesson, &c. The yellow on the top of the head and back of neck is also of a much paler colour, both in the specimens with and without lateral plumes. In Forrest's 'Voyage to New Guinea' it is stated that the Great Bird of Paradise of Aroo migrated "when the easterly or wet monsoon set in" to New Guinea; but we learn from the interesting paper* of Mr. A. R. Wallace, that this "is quite incorrect, as they are permanent residents in Aru, and the natives know nothing of their being found in New Guinea." The two differences previously mentioned, which were uniform in all the specimens sent home by Mr. Wallace, induce me to suppose that, if not a *distinct* species, it is at least a well-marked local variety of the Great Bird of Paradise.

Hab. Aru Islands. ♂ in several states of plumage. In British Museum.

74. PARADISEA REGIA.

Paradisea regia, Linn. S. N. i. p. 166.

Ciccinnurus spinturnix, Less.

Hab. Aru Islands. ♂ in changes of plumage. In British Museum.

STURNIDÆ.

75. PTILONORHYNCHUS MELANOTIS.

Head, neck and nape fulvous-white margined with black, and some on the latter with green; back, wings, and upper side of tail green; tips of some of the wing-coverts, of tertials and of tail feathers buffy white; throat white, narrowly margined with black; under surface fulvous white, tinged in some places with yellow and pale green, and margined with black on breast, fore part of abdomen, and sides; under wing- and tail-coverts buffy white; bill yellow, and feet plumbeous.

Length 13" 6''; wings 7''.

Hab. Aru Islands. ♂ in British Museum.

76. CALORNIS VIRIDESCENS.

Lamprotornis cantor, Müll.?

Differs from *L. metallicus* (Temm.), in having the purple glossy appearances only on the head, nape and upper part of breast; in these respects it agrees with the specimen (*C. nitida*) from New Ireland, but the latter is rather larger in all its dimensions; and it

* Ann. and Mag. of Nat. Hist. 1857, vol. xx. p. 411.

is also like in colour to the specimen (*C. amboinensis*) from Amboyna, while in this the bill is rather larger and more arched than either of the others, and the tail and wings are rather less in length than in the New Ireland species.

Length 8" 9''' to the end of middle tail-feathers : wings 4" 2'''.

Hab. Aru Islands. ♂ ♂ in changes. In British Museum.

77. GRACULA DUMONTII.

Mino Dumontii, Less. Voy. Coqu. t. 26.

Gracula Dumontii, Wagl.

Hab. Aru Islands. ♂ ♀ in British Museum.

PSITTACIDÆ.

78. CORIPHILUS PLACENTIS.

Psittacus placentis, Temm. Pl. Col. 553.

Coriphilus placentis, G. R. Gray, Gen. of B. ii. p. 417.

Psittuteles placens, Bp. Rev. et Mag. de Zool. 1854, p. 157.

Hab. Aru Islands. ♂ in Mr. Wallace's Collection.

79. ECLECTUS LINNÆI.

Eclectus Linnæi, Wagl. Monagr. Psitt. p. 571. t. 22.

Eclectus puniceus, Bp. Rev. et Mag. de Zool. 1854, p. 155.

Hab. Aru Islands. ♀ in British Museum.

80. ECLECTUS POLYCHLOROS.

Var. *aruensis*.

Psittacus magnus, pt., Wagl.

This variety differs from the *E. polychloros* by having the ends of the tail-feathers above more prominently tipped with yellow, which is in some feathers tinged with purple.

Hab. Aru Islands. ♂ in British Museum.

81. CHALCOPSITTA RUBRIFRONS. (Pl. CXXXV.)

The front, lores, sides of the breast, and spots on throat carmine ; hind head and ear-coverts purplish black ; throat purple with streaks of green ; breast purplish green, with a broad orange-yellow streak down the shaft of each feather ; back of neck and nape purplish green, streaked down the shafts with rich yellow ; scapulars, wings and tail green ; back and rump light green streaked with yellow ; under wing-coverts, inner webs near the base of tail, and thighs, carmine ; quills beneath at base yellow tinged on some feathers with carmine ; abdomen, sides, and under tail-coverts green, streaked with yellow intermixed near the thighs with crimson ; beneath the tail carmine, tipped with obscure yellow.

Length 12" ; wings 7" 2'''.

Hab. Aru Islands. ♂ ♀ in British Museum.

Allied to *C. scintillata*, which has the ends of the tail-feathers acutely pointed, while in the Aru species they are decidedly rounded.

82. *TRICHOGLOSSUS NIGROGULARIS*.*Trichoglossus capistratus*, var., Müll.?

Green; front and sides of the head azure; occiput dark bronzy green; semicollar above greenish yellow; throat blue-black; nape scarlet broadly margined with green; breast tinged with yellow narrowly margined with black; abdomen green broadly margined with black; fore part of sides scarlet bordered with green hind part of sides, thighs and under tail-coverts yellow bordered with green; under wing-coverts scarlet; quills black beneath and yellow at their bases.

Length 13" 6"; wings 6" 3".

Hab. Aru Islands. ♂ ♀ in British Museum.It is intermediate between *T. Swainsoni* and *T. cyanogrammus*.83. *TRICHOGLOSSUS COCCINEIFRONS*.

Green; front and spots on the head carmine; head and chin whitish blue; nape and upper part of the abdomen scarlet, the two latter margined with blue; some of the lesser wing-coverts marked with yellow and scarlet; under wing-coverts and inner margins of tail-feathers scarlet; base of quills beneath yellow tinged with scarlet, quills above green marked in some places with yellow; abdomen varied with blue, green, scarlet and yellow; under tail-coverts varied with yellow, green and pale scarlet.

Length 11"; wings 5" 10".

Hab. Aru Islands. ♂ in Mr. Wallace's Collection.84. *PSITTACUS ARUENSIS*.

♂. Green, paler on the margins of the feathers; top of head silvery blue; front and cheeks scarlet-red; chin reddish yellow; under surface yellowish green; spot on each wing castaneous red; under wing-coverts verditer blue.

♀. Head rusty brown; otherwise yellowish green.

♂ juv. Head of the same green as the back, but the sides of head brownish green.

Length 8" 9"; wings 6" 3".

Hab. Aru Islands. ♂ ♀ in British Museum.85. *PSITTACUS CAPISTRATUS*.

♂. Head brown tinged with green, and mixed with dull rufous; general colour green edged with paler; upper tail-coverts yellowish green; under wing-coverts and the fore part of the sides verditer blue.

Length 12"; wings 7" 5".

Hab. Ké Islands. ♂ in British Museum.

Like the female of former species, but it is much larger in size.

86. *PSITTACULA DIOPHTHALMA*.

Cyclopsitta diophthalma, Homb. & Jacq. Voy. Pôle Sud, t. 25 bis, f. 4, 5.

Psittacula diophthalma, Homb. & Jacq.*Hab.* Aru Islands. ♂ ♀ in British Museum.

87. *CACATUA TRITON*.

Cacatua triton, Temm. Consp. Gen. Ind. Arch. iii. p. 405.

Psittacus galeritus, Less. Voy. Coqu. Zool. i. p. 624?

Length 16"; wings 10" 3".

Hab. Aru Islands. ♀ in Mr. Wallace's Collection.

88. *MICROGLOSSUM ATERRIMUM*.

Psittacus aterrimus, Gmel. S. N. i. p. 330.

Psittacus goliath, Kuhl, Consp. Psitt. pp. 12, 91.

Microglossum aterrimum, Wagl. Monogr. Psitt. p. 682.

Hab. Aru Islands. ♂ ♀ in British Museum.

CUCULIDÆ.

89. *CENTROPUS MENEBIKI*.

Centropus Menebiki, Garn. Voy. Coqu. t. 33.

Hab. Aru Islands. ♂ in British Museum.

90. *CENTROPUS SPILOPTERUS*.

Greenish bronzy black; shafts of the feathers strong and deep shining black; wings with small irregular spots of brownish white.

Length 21"; wings 9" 3".

Hab. Ké Islands. ♂ in Mr. Wallace's Collection.

91. *CUCULUS ASSIMILIS*.

Allied to *C. flavus*. Bronzy brown, marked on some of the edges with pale rufous; side of head and chin tinged with grey; under surface rusty colour, with the throat, breast and abdomen banded with slate-colour; tail bronzy brown, with triangular marks along the edges of each feather.

Hab. Aru Islands. ♀ in Mr. Wallace's Collection.

92. *CUCULUS MEGARHYNCHUS*.

Top and sides of the head greyish black; upper surface bronzy brown edged with rusty; under surface brownish white mixed with rusty, and spotted with minute spots of greyish black; tail bronzy brown, tipped with rusty white, with the outer feather banded in the inner web with rusty white.

Length 7" 6"; wings 3" 9".

Hab. Aru Islands. ♂ in Mr. Wallace's Collection.

COLUMBIDÆ.

93. *PTILONOPUS SUPERBUS*.

Columba superba, Temm. Fig. t. 33.

Ptilonopus superbus, Steph. Gen. Zool. xiv. 1. p. 279; Gould, B. of Austr. v. pl. 57.

Lamprotreron superba, Bp. Consp. Av. ii. p. 18.

Hab. Aru Islands. ♂ in British Museum.

94. *PTILONOPUS PERLATUS*.

Columba perlata, Temm. Pl. Col. 559.

Ptilonopus perlatus, G. R. Gray.

Sylphitron perlatum, Verr. ; Bp. Consp. Av. ii. p. 40.

Hab. Aru Islands. ♂ in British Museum.

95. *PTILONOPUS PRASINORRHOUS*.

Closely allied to *Ptilonopus Rivoli*, but it is at once distinguished by the vent and under tail-coverts being green, slightly margined on each feather with yellow ; the reddish purple patch on the abdomen is connected to the white pectoral band ; bill yellow, and feet red.

Hab. Ké Islands. ♂ in British Museum.

96. *PTILONOPUS WALLACII*. (Pl. CXXXVI.)

Top of head carmine ; cheeks and throat pure white ; neck, nape and breast greyish white ; lower part of breast with a band of white bordered posteriorly with a broad one of orange ; lesser wing-coverts with a band of deep orange ; abdomen and under tail-coverts varied with yellow and green ; upper part of back orange-green ; scapulars and some of the greater wing-coverts grey margined with orange-yellow ; the other greater wing-coverts and secondaries yellowish green margined with yellow ; quills rich emerald green ; tertials yellowish green spotted with grey ; lower part of back rich yellowish green ; tail coppery green with the apical half greenish white ; bill yellow, and feet red.

Length 10" ; wings 5" 9".

Hab. Aru Islands. ♂ ♀ in British Museum.

Most allied to *Ptilonopus pulchellus*, but differs in several respects.

97. *PTILONOPUS AURANTIFRONS*. (Pl. CXXXVII.)

Front deep rich orange ; occiput and sides of head yellowish green ; chin pure white ; neck sooty grey ; breast and beneath the body yellowish green mixed with grey on the thighs ; nape and scapulars grey, each feather of former margined with orange, those of the latter margined with green ; back and wing-coverts green, with some of the feathers spotted with grey, and others margined with orange-yellow ; quills rich emerald-green with the secondaries bordered with yellow ; tail coppery green with a narrow band of grey at the tip, which is white beneath ; under tail-coverts yellow varied with green ; bill yellow ; cere and feet red. "Iris orange."

Length 9" 9" ; wings 5" 6".

Hab. Aru Islands. ♂ ♀ in British Museum.

98. *PTILONOPUS CORONULATUS*. (Pl. CXXXVIII.)

Yellowish green ; front whitish purple, with posteriorly a narrow band of purple, and then a broader band of golden yellow ; occiput deep green ; chin yellowish white ; wings and tail shining emerald-

green margined narrowly with yellow; a spot on fore part of abdomen purple; middle of hind part of abdomen and under tail-coverts bright yellow.

Length 7" 9"; wings 4" 6". Iris orange.

Hab. Aru Islands. ♂ in British Museum.

99. PTILONOPUS IOZONUS.

♂. Yellowish green; bend of wings greyish violet mixed with green; middle of the abdomen deep orange; vent and under tail-coverts white varied with yellow; greater wing-coverts and tertials bordered with yellow, the latter grey in the middle of each feather; quills shining deep emerald-green; under surface of wings slate-colour; tail green with a broad band of grey at the tip, which is white beneath, especially on the inner webs.

♀. With a patch on the abdomen of an orange-yellow.

Length 8" 3"; wings 4" 9".

Hab. Aru Islands. ♀ in British Museum.

Most like *Ptilonopus nanus*.

100. CARPOPHAGA ZOEAÆ.

Columba zoea, Less. Voy. Coqu. t. 39.

Carpophaga zoea, G. R. Gray.

Zonænas zoea, Reich.

Hab. Aru Islands. ♂ ♀ in British Museum.

101. CARPOPHAGA PINON.

Columba pinon, Quoy et Gaim. Voy. Uranie, t. 28.

Carpophaga pinon, Selby, Nat. Libr. v. p. 119.

Zonænas pinon, Bp. Consp. Av. p. 37.

Hab. Aru Islands. ♂ ♀ in British Museum.

102. CARPOPHAGA MULLERI.

Columba Mulleri, Temm. Pl. Col. 566.

Carpophaga Mulleri, G. R. Gray.

Zonænas Mulleri, Reich.

Hab. Aru Islands. ♂ ♀ in British Museum.

103. CARPOPHAGA SPILORRHOA.

Carpophaga luctuosa, Gould, B. of Austr. v. pl. 60.

Columba alba, Müll.?

This species is distinguished by the feathers of the thighs and under tail-coverts being spotted near the margins, and the outer tail-feather with the greater part of the outer web and tip black; while in *C. luctuosa* the feathers of the thighs and under tail-coverts end in deep black, and the outer tail-feather is white throughout, except on the outer web nearest the base.

Hab. Aru Islands. ♂ in British Museum.

104. CARPOPHAGA CHALYBURA.

Carpophaga chalybura, Bp. Consp. Av. ii. p. 32.*Columba aenea*, ♂, Temm. Fig. t. 3.*Columba aenea*, var. β, Wagl. Syst. Av. Col. sp. 15.*Hab.* Aru Islands. ♂ in British Museum.

105. MACROPYGIA PHASIANELLA.

Columba phasianella, Temm. Pl. Col. 100.*Macropygia phasianella*, Gould, B. of Austr. v. pl. 75.*Hab.* Aru Islands. ♀ in British Museum.

Ké Islands. ♀ in Mr. Wallace's Collection.

MEGAPODIDÆ.

106. TALEGALLUS CUVIERI.

Talegallus Cuvieri, Less. Voy. Coqu. t. 38.*Hab.* Aru Islands. Young in Mr. Wallace's Collection.

107. MEGAPODIUS REINWARDTII.

Megapodius Reinwardtii, Wagl. Syst. Av. (additamenta, p. 4).*Megapodius Duperreyii*, Less. Voy. Coqu. t. 36.*Hab.* Aru Islands. ♂, ♀, juv. and egg in British Museum.

Ké Island. ♀ in British Museum.

STRUTHIONIDÆ.

108. CASUARIUS EMU.

Struthio casuarius, Linn. S. N. i. p. 265.*Casuarius emu*, Lath.*Casuarius galeatus*, Vieill.*Hab.* Aru Islands. Sternum in British Museum.

CHARADRIADÆ.

109. ESACUS MAGNIROSTRIS.

Charadrius magnirostris, Lath. Ind. Orn. Suppl. p. lxvi.*Edicnemus magnirostris*, Temm. Pl. Col. 387.*Esacus magnirostris*, G. R. Gray, List of Gen. of B. 1841, p. 83.*Hab.* Aru Islands. ♀ in British Museum.

110. CHARADRIUS XANTHOCEILUS.

Charadrius xanthocheilus, Wagl. Syst. Av. Char. sp. 36; Gould, B. of Austr. vi. pl. 13.*Hab.* Aru Islands. ♀ in Mr. Wallace's Collection.

111. CHARADRIUS INORNATUS.

Hiaticula inornata, Gould, B. of Austr. iv. pl. 19.*Hab.* Aru Islands. ♂ in Mr. Wallace's Collection.

112. *HÆMATOPUS LONGIROSTRIS*, var.*Hæmatopus ostralegus*, Müll.*Hæmatopus longirostris*, Vieill.*Hab.* Aru Islands. In Mr. Wallace's Collection.113. *ARDEA ARUENSIS*.Differs from *Herodias picata*, Gould, by having the feathers of the top of the head and the under surface of the body pure white.*Hab.* Aru Islands. ♂ in Mr. Wallace's Collection.114. *NUMENIUS UROPYGIALIS*.*Numenius phæopus*, Müll.?*Numenius uropygialis*, Gould, B. of Austr. vi. pl. 43.*Numenius minor*, Müll.*Hab.* Aru Islands. ♂ in Mr. Wallace's Collection.115. *PHALAROPUS HYPERBOREUS*.*Tringa hyperborea*, Linn. S. N. i. p. 249.*Phalaropus hyperboreus*, Cuv.*Hab.* Aru Islands. ♀, in winter plumage, in British Museum.116. *EULABEORNIS CASTANEOVENTRIS*.*Eulabeornis castaneoventris*, Gould, B. of Austr. vi. pl. 78.*Hab.* Aru Islands. ♂ ♀ in British Museum.117. *RALLINA TRICOLOR*.

Head, neck, nape and breast rusty red, paler on the throat; back, wing and abdomen slaty black tinged in some places with olive-brown; the sides, thighs and under tail-coverts banded with pale rufous; wings beneath slaty black banded with white; bend of the wings, both above and below, spotted with rufous white.

Length 10" 6''' ; wings 5" 6'''.

Hab. Aru Islands. ♀ in Mr. Wallace's Collection.118. *STERNA TORRESII*.*Thalasseus Torresii*, Gould, B. of Austr. vii. pl. 25.*Hab.* Aru Islands. ♀ in British Museum.119. *SULA FIBER*.*Pelecanus fiber*, Linn. S. N. i. p. 218.*Sula fiber*, G. R. Gray, List of B. in B.M. iii. p. 183.*Sula fusca*, Gould, B. of Austr. vii. pl. 78.*Hab.* Near Ké Island. ♂ in Mr. Wallace's Collection.

TABLE OF SPECIES.

** denotes those contained in the British Museum from this particular locality.

	New Guinea.	Ara Islands.	Ké Islands.	Locidade Archipelago.	Waigiu.	Timor last.	N. Australia to 16° lat. S.; P. Esang-ton, C. York, &c.	Islands in Torres Strait.
<i>Cucuma leucogaster</i>	*	...	**	**	*
<i>Haliastur leucosternus</i>	*	**	*
<i>sphenurus</i>	*	**	
<i>Pandion leucocephalus</i>	**	*
<i>Jeracidea berigora</i>	*	
<i>Falco frontatus</i>	*
<i>Milvus affinis</i>	*	
<i>Beza stenozona</i>	*	
<i>Astur novæ hollandiæ</i>	*	**
<i>longicauda</i>	*	
<i>radiatus</i>	**	
<i>approximans</i>	*	
<i>Accipiter poliocephalus</i>	*	
<i>cirrocephalus</i>	*	*
<i>Circus assimilis</i>	**
<i>Athene humeralis</i>	*	
<i>theomacha</i>	*	
<i>boobook</i>	**	
<i>rufa</i>	*	
<i>maculata</i>	*	
<i>Strix delicatula</i>	*	*
<i>personata</i>	**	
<i>Podargus papuensis</i>	*	**	
<i>ocellatus</i>	*	*	
<i>marmoratus</i>	**	
<i>phalænoides</i>	**	
<i>Egotheles leucogaster</i>	**	
<i>Caprimulgus macrurus</i>	**	*	
<i>Eurostopodus albigularis</i>	*	**
<i>guttatus</i>	**	**
<i>Cypselus australis</i>	**	*
<i>Macropteryx mystaceus</i>	**	**	
<i>Acanthylis caudacuta</i>	**	*
<i>Collocalia hypoleuca</i>	*	
<i>nidifica</i> , var.	**	
<i>Hirundo frontalis</i>	*	*
<i>nigricans</i>	**	
<i>neoxena</i>	**	
<i>Eurystomus gularis</i>	**	
<i>pacificus</i>	**	
<i>Coracias Temminckii</i>	*	
<i>Peltops Blainvillei</i>	*	
<i>Dacelo Leachii</i>	*	
<i>cervinus</i>	**	
<i>undulatus</i> , Sonn. 186	*	
?, Sonn. 107	*	
<i>tyro</i>	**	
<i>Gaudichaudi</i>	**	**	*	
<i>macrorhynchus</i>	*	

TABLE (continued).

	New Guinea.	Aru Islands.	Ké Islands.	Louisiade Archipelago.	Waiglon.	Timor laut.	N. Australia to 14° lat. S., P. Esing-ton, C. York, &c.	Islands in Torres Strait.
<i>Halcyon collaris</i>	*						
<i>albicilla</i>	**	**				
<i>sancta</i>	**	**	*	
<i>cinnamomina</i>	*							
<i>sordida</i>	**	*	*	
<i>MacLeayi</i>	**	*	
<i>Tanyptera dea</i>	**							
<i>hydrocharis</i>	**						
<i>sylvia</i>	*?	**		
<i>Syma torotoro</i>	*	*						
<i>flavirostris</i>	**		
<i>Ceyx lepida</i>	*							
<i>solitaria</i>	*	*						
(meningting, <i>Less.</i>)								
<i>pusilla</i>	*	**	**		
<i>Alcyon azurea</i> , var.	*	**	**		
<i>Merops ornatus</i>	**	*	
<i>Epimachus maximus</i>	**							
<i>albus</i>	**							
<i>magnificus</i>	**	**		
<i>Nectarinia aspasia</i>	*	*						
<i>zenobia</i>	*	...	*					
<i>frenata</i>	*	**		*	
? <i>australis</i>	**		
<i>amasia</i>	*							
<i>eximia</i>	*							
<i>eques</i>	*	...	*					
<i>Arachnothera novæ guineæ</i>	**	**						
<i>Dicaeum papuense</i>	**							
<i>pectorale</i>	*							
<i>hirundinaceum</i>	**	*	
<i>ignicolle</i>	**						
<i>Prionichilus niger</i>	*	**						
<i>Myzomela nigrita</i>	**						
<i>chermesina</i>	*?							
<i>erythrocephala</i>	**	*	*	
<i>obscura</i>	**	*	
<i>pectoralis</i>	*		
<i>sanguinolenta</i>	*		
<i>Glyciphila fasciata</i>	**		
<i>modesta</i>	*						
<i>ocularis</i>	*	**	**		
<i>Ptilotis flaviventris</i>	*							
(<i>chrysotis</i> , <i>Less.</i>)								
<i>filigera</i>	**	**		
<i>unicolor</i>	**		
<i>fumata</i>	*							
<i>similis</i>	*	**						
<i>megarhynchus</i>	*						
? <i>striolata</i>	*							

TABLE (continued).

	New Guinea.	Aru Islands.	Ké Islands.	Louisiade Archipelago.	Waigou.	Timor laut.	N. Australia to 14° lat. S., P. Esing-ton, C. York, &c.	Islands in Torres Strait.
? <i>Ptilotis auriculata</i>	*							
<i>chrysotis</i>	*	*
<i>flavescens</i>	*	
<i>flava</i>	*	
<i>Tropidorhynchus corniculatus</i>	*							
<i>nov. guineæ</i>	*	**						
<i>plumigenis</i>	*					
<i>argenteiceps</i>	**	
<i>citreogularis</i> , var.	*	
<i>vulturinus</i>	*	
<i>buceroides</i>	**	
<i>Entomophila albigularis</i>	*	**	
<i>rufogularis</i>	*	
<i>Entomyza albigennis</i>	**	
<i>Melithreptus albigularis</i>	**	
<i>Climacteris melanotos</i>	**	
<i>Sittella leucoptera</i>	**	
<i>Cisticola lineocapilla</i>	**	*
<i>ruficeps</i>	**	**
<i>Sphenæacus galactotes</i>	*	*
<i>Cinclocephalus cantillans</i>	*	
<i>Malurus amabilis</i>	*	
<i>Browni</i>	**	
<i>Gerygone chrysogaster</i>	**		
<i>magnirostris</i>	*	
<i>lævigaster</i>	*	
<i>chloronotus</i>	*	
<i>Zosterops citrinella</i>	**		*
(<i>albiventris</i> , H. & J.)								
<i>griseotincta</i>	**		
<i>lutea</i>	**	*
<i>Petroica bicolor</i> ?	**	*
<i>Drymodes superciliaris</i>	**	
<i>Grallina australis</i>	*	
<i>Anthus australis</i>	*	
<i>Eupetes ajax</i>	*							
<i>cærulescens</i>	*							
<i>Tardirostrum murinum</i>	*							
<i>Alcippe monacha</i>	**						
<i>Pitta Macklotii</i>	*	**						
<i>novæ guineæ</i>	*	**						
<i>streptans</i>	*	*
<i>iris</i>	**	
<i>Oriolus Mulleri</i>	*	**						
<i>striatus</i>	*							
<i>melanotis</i>	**							
<i>assimilis</i>	*	
<i>viridis</i>	**	
<i>flavocinctus</i>	**	
<i>affinis</i>	*	

TABLE (continued).[illegible]

TABLE (continued).

	New Guinea.	Aru Islands.	Ké Islands.	Louisiade Archipelago.	Waigou.	Timor laut.	N. Australia to 14° lat. S., P. Easington, C. York, &c.	Islands in Torres Strait.
<i>Pachycephala simplex</i>	**	
<i>Hylocharis</i> —, <i>Mull.</i>	*							
<i>Campephaga Desgrazii</i>	*							
<i>Boyeri</i>	*							
<i>cæruleogrisea</i>	*						
<i>melanops</i>	**	*	*
<i>hypoleuca</i>	*	...	**	*	
<i>melas</i>	*							
<i>plumbea</i>	*							
<i>novæ guineæ</i>	*							
<i>papuensis</i>	*							
<i>schisticeps</i>	*							
<i>Swainsoni</i>	*	
<i>Jardini</i>	*	
<i>Lalage rufigentris</i>	*?	**	*
(Kara, <i>Gould.</i>)								
<i>polygrammica</i>	**						
<i>Artamus papuensis</i>	*	*						
<i>minor</i>	**	
<i>leucopygialis</i>	**	*
<i>albiventris</i>	*	
<i>Dicrurus bracteatus</i>	**	*
<i>assimilis</i>	**						
<i>megalornis</i>	*					
<i>megarhynchus</i>	*							
<i>carbonarius</i>	*							
<i>Rectes kirrocephalus</i>	**							
<i>dichrous</i>	*	**						
<i>strepitans</i>	*	**						
<i>Colluricincla brunnea</i>	**	*
<i>harmonica</i>	*	
<i>parvula</i>	**	
<i>Myiolestes megarhynchus</i>	**							
<i>aruensis</i>	**						
<i>griseatus</i>	**	
<i>pulverulentus</i>	*							
<i>Cracticus cassicus</i>	*							
<i>personatus</i>	**						
<i>nigrogularis</i>	*	
<i>Quoyi</i>	*	**	**	
<i>picatus</i>	**	
<i>argentatus</i>	*	
<i>Corvus orru</i>	*	**						
(<i>macrorhynchus</i> , pt., <i>Wagl.</i>)								
<i>corone</i> , pt., <i>Wagl.</i>	*							
<i>coronoides</i>	*	*
<i>Gymnocorvus senex</i>	*							
<i>Paradisea apoda</i>	**							
var. <i>Wallaciana</i>	**						
<i>papuensis</i>	**							

TABLE (continued).

	New Guinea.	Aru Islands.	Ké Islands.	Louisiana Archipelago.	Waigao.	Timor laut.	N. Australia to 14° lat. S., P. Esling-ton, C. York, &c.	Islands in Torres Strait.
<i>Paradisca regia</i>	**	**						
<i>speciosa</i>	**							
<i>atra</i>	**							
<i>seppennis</i>	**							
<i>rubra</i>	*			
<i>Wilsoni</i>	*							
<i>Astrapia nigra</i>	**							
<i>carunculata</i>	*							
<i>Ptilonorhynchus buccoides</i>	*							
<i>melanotis</i>		**						
<i>Chlamydera cerviniventris</i>	**	*
<i>Manucodia viridis</i>	**	**						
<i>atra</i>	*							
<i>Keraudrenii</i>	*	**	
<i>Lamprotorus viridescens</i>	**						
<i>metallica</i>	**	
<i>Gracula Dumontii</i>	**	**						
<i>Donacola castaneothorax</i>	*	*
<i>flavipyrina</i>	**	
<i>Estrela annulosa</i>	**	
<i>phaeton</i>	**	
<i>Amadina castanotis</i>	**	
<i>Gouldiae</i>	**	
<i>mirabilis</i>	**	
<i>Poephila acuticauda</i>	**	
<i>personata</i>	**	
<i>Buceros rufoollis</i>	*	*			
<i>Platycercus dorsalis</i>	**							
<i>palliceps</i>	**	
<i>cyanogenys</i>	**	
<i>Brownii</i>	*	
<i>Aprosmictus erythropterus</i> , var. ...	*	**	
<i>Chalcopsitta nov. guineæ</i>	*							
<i>scintillata</i>	*							
<i>rubrifrons</i>	**						
<i>rubiginosa</i>	**			
<i>Charmosyna papua</i>	**							
<i>Lorius domicella</i>	*							
<i>tricolor</i>	*	**				
<i>puniceus</i>	*							
<i>Eos squamata</i>	*							
<i>Eclectus Linnaei</i>	**						
<i>Psittacodis polychloros</i>	*	*			
var. <i>aruensis</i>	**						
<i>tarabe</i>	*							
<i>Coriphilus placentis</i>	**	*						
<i>Trichoglossus Swainsonii</i>	*
<i>rubritorquis</i>	*	
? <i>capistratus</i> , var.	*							
<i>coccineifrons</i>	*						

TABLE (continued).

	New Guinea.	Aru Islands.	Ké Islands.	Louisiade Archipelago.	Waiglon.	Timor laut.	N. Australia to 14° lat. S., P. Esing-ton, C. York, &c.	Islands in Torres Strait.
<i>Trichoglossus nigrogularis</i>	**						
<i>versicolor</i>	**	
? <i>Tanygnathus marginatus</i>	*							
<i>macrorhynchus</i>	*							
<i>Pittaacus Pucherani</i>	*							
<i>personatus</i>	*							
<i>capistratus</i>	**						
<i>aruensis</i>	**						
<i>Desmarestii</i>	*							
<i>Pittacula diophthalmus</i>	*	**						
<i>Nasiterna pygmaea</i>	*							
<i>Cacatua equatorialis</i>	*							
(<i>C. sulphurea</i> ?)								
<i>triton</i>	*	*						
(<i>C. galerita</i> .)								
? <i>galerita</i>	*	*
<i>sanguinea</i>	*	
<i>Calyptorhynchus macrorhynchus</i>	*	
<i>Microglossum aterrimum</i>	**	**	*	...	**	
<i>alecto</i>	*							
<i>Dasyptilus paraguayanus</i>	*			
<i>Pesquetii</i>	*							
? <i>Chrysocolaptes cardinalis</i>	*							
<i>Centropus Menebiki</i>	*	**						
<i>spilopterus</i>	*						
<i>phasianus (macrourus)</i>	**	*
<i>Eudynamis punctatus</i>	*							
(<i>rufiventris, Less.</i>)								
<i>Flindersii</i>	**	*
<i>Caculus leucolophus</i>	*							
<i>assimilis</i>	*						
<i>megarhynchus</i>	*						
<i>dumetorum</i>	*	
<i>Chrysococcyx lucidus</i>	*	*	
<i>Ptilonopus superbus</i>	**	*	*
<i>Rivoli</i>	*							
<i>strophium</i>	**				
<i>prasinorrhous</i>	**					
<i>perilatus</i>	*	**						
<i>Wallacii</i>	**						
<i>pulchellus</i>	**							
<i>cyanovirens</i>	**							
<i>virens</i>	*							
<i>aurantiifrons</i>	**						
<i>coronulatus</i>	**						
<i>nainus</i>	*							
<i>iozonus</i>	**						
<i>viridis</i>	*							
<i>Ewingii</i>	**	
<i>Carpophaga pinon</i>	**	**	*			

TABLE (continued).

	New Guinea.	Aru Islands.	Ké Islands.	Louisiade Archipelago.	Waigiu.	Timor Isant.	N. Australia to 14° lat. S.; P. Eschington, C. York, &c.	Islands in Torres Strait.
<i>Carpophaga zoeæ</i>	*	**						
<i>Mulleri</i>	*	**						
<i>bicolor</i>	*							
<i>spilorrhœa</i>	**	**	**	
<i>chalybura</i>	**						
<i>Sundevalli</i>	**				
<i>pacifica</i>	*							
(<i>ænea</i> , <i>Auct.</i>)								
<i>myristicivora</i>	*							
<i>albogularis</i>	*	**				
<i>rufigaster</i>	*							
<i>puella</i>	**							
<i>assimilis</i>	**	
<i>Leclancheri</i>	**							
<i>Lopholaimus antarcticus</i>	*	
<i>Macropygia phasianella</i>	**						
<i>doreya</i>	*							
<i>Reinwardtii</i>	*							
<i>Geopelia humeralis</i>	*	**	*
<i>tranquilla</i> (?)	*	
<i>placida</i>	**	
<i>Chalcophaps chrysoclora</i>	**	
<i>stephanie</i>	*							
<i>Petrophassa albipennis</i>	*	
<i>Peristera chalcoptera</i>	**	
<i>histrionica</i>	*	
<i>Trugon terrestris</i>	*							
<i>Geophaps Smithii</i>	**	
<i>Lophophaps plumifera</i>	**	
<i>Caloenas nicobarica</i>	**				
<i>rufigula</i>	*							
<i>Goura coronata</i>	**							
<i>Victoriæ</i>	**							
<i>Talegallus Cuvieri</i>	*							
<i>Lathamii</i>	**	
<i>Megacephalon maleo</i>	*							
<i>Megapodius Duperreyi</i>	*	**						
<i>Freyinetii</i>	*	*			
<i>rubripes</i>	*							
<i>tumulus</i>	**	*
<i>Coturnix novæ guineæ</i>	*							
<i>pectoralis</i>	*	
<i>australis</i>	*	*
<i>sinensis</i>	*
<i>Turnix melanota</i>	*	*
<i>castanota</i>	**	
<i>Casuaris emu</i>	*	*						
<i>australis</i>	*	
<i>Dromaius novæ hollandiæ</i>	*	
<i>Esacus magnirostris</i>	*	**	*	*

TABLE (continued).

	New Guinea.	Aru Islands.	Ké Islands.	Louisiade Archipelago.	Waigiu.	Timor laut.	N. Australia to 14° lat. S., P. Eschington, C. York, &c.	Islands in Torres Strait.
<i>Glareola grallaria</i>	*						**	
<i>Lobivanellus personatus</i>	**	
<i>Charadrius xanthocheilus</i>		*	**	*
<i>veredus</i>	*	
<i>ruficapillus</i>	*	*
<i>inornatus</i>	*?	*	*	*
<i>Cinclus interpres</i>	*	*	*
<i>Hæmatopus longirostris</i>		*	**	*
<i>fuliginosus</i>	*	*
<i>Grus australasianus</i>	*	
<i>Ardea rectirostris</i>	**	
<i>pacifica</i>	*	
<i>nov. guineæ</i>	*	*	
<i>jugularis</i>	*?	**	*
? <i>Greyii</i>	**	**	*
<i>plumifera</i>	*	*
<i>syrmatophora</i>	*
<i>immaculata</i>	*	
<i>picata</i>	**	
<i>aruensis</i>	*	*	
<i>Nycticorax caledonicus</i>	**	*
<i>Ardetta stagnatilis</i>	*	*	*
(<i>virescens</i> , <i>Auct.</i>)								
<i>flavicollis</i>	*	
<i>Botaurus heliosyla</i>	*	*	
<i>Mycteria australis</i>	*	
<i>Threskiornis strictipennis</i>	*	
<i>Falcinellus igneus</i>	**	
<i>Platalea regia</i>	**	
<i>Numenius uropygialis</i>	*	**	*
(<i>phæopus</i> ?)								
<i>australis</i>	**	*
<i>minutus</i>	**	
<i>Limosa uropygialis</i>	**	*
<i>melanuroides</i>	*	
<i>Xenus cinereus</i>	**	
<i>Totanus glottoides</i>	**	*
<i>griseopygius</i>	**	
<i>Tringoides empusa</i>	*	*	
(<i>hypoleucus</i> ?)								
<i>Himantopus leucocephalus</i>	*	**	
(<i>candidus</i> ?).								
<i>Tringa albescent</i>	*	*	*
(<i>pusilla</i> ?).								
<i>australis</i>	**	*
<i>Scolopax australis</i>	*	
<i>Phalaropus hyperboreus</i> , var.	**	*	
<i>Parra gallinacea</i>	*	**	
<i>Rallus tricolor</i>	*	*	
<i>oculeus</i>	**	*	

[illegible]

April 13, 1858.

Dr. Gray, F.R.S., V.P., in the Chair.

The following papers were read :—

1. ON THE SNIPES' "NEIGHING" OR HUMMING NOISE, AND ON ITS TAIL-FEATHERS' SYSTEMATIC VALUE. BY W. MEVES, CONSERVATOR AT THE ZOOLOGICAL RIKS-MUSEUM IN STOCKHOLM. TRANSLATED AND COMMUNICATED BY JOHN WOLLEY, JUN., ESQ., F.Z.S.

On the origin of the neighing sound which accompanies the single Snipe's (*Scolopax gallinago*, L.) play—flight during pairing time—opinions are various. Bechstein thought that it was produced by means of the beak; Naumann and others, again, that it originated in powerful strokes of the wing: but since Pralle* in Hanover observed that the bird makes heard its well-known song or cry, which he expresses with the words "gick jack, gick jack!" at the same time with the neighing sound, it seemed to be settled that the latter is not produced through the throat. In the mean time I have remarked with surprise, that the humming sound could never be observed whilst the bird was flying upwards, at which time the tail is closed; but only when it was casting itself downwards in a slanting direction, with the tail strongly spread out.

The peculiar form of the tail-feathers in some foreign species nearly allied to our Snipe (for example, *S. javensis*) encouraged the notion, that the tail, if not alone, at all events in a considerable degree, conduced to the production of the sound. On a closer examination of the tail-feathers of our common species, I found the first (outer) feather, especially, very peculiarly constructed; the shaft, uncommonly stiff, sabre-shaped; the rays of the web strongly bound together and very long, the longest reaching nearly three-fourths of the whole length of the web, these rays lying along (or spanning from end to end of the curve of) the shaft, like the strings of a musical instrument (Fig. 1). If one blows from the outer side upon the broad web it comes into vibration, and a sound is heard, which, though fainter, resembles very closely the well-known neighing.

But to convince one's self fully that it is the first feather which produces the peculiar sound, it is only necessary carefully to pluck out such a one, to fasten its shaft with fine thread to a piece of steel wire a tenth of an inch in diameter and a foot long, and then to fix this at the end of a 4-foot stick. If now one draws the feather, with its outer side forward, sharply through the air, at the same time making some short movements or shakings of the arm so as to represent the shivering motion of the wings during flight, one produces the neighing sound with the most astonishing exactness.

* Naumannia.

If one wishes to hear the humming of both feathers at once, as must be the case from the flying bird, this also can be managed by a simple contrivance. One takes a small stick, and fastens at the side of the smaller end a piece of burnt steel wire in the form of a fork ; one binds to each point a side tail-feather ; one bends the wire so that the feathers receive the same direction which they do in the spreading of the tail as the bird sinks itself in flight ; and then with this apparatus one draws the feathers through the air, as before.

Such a sound, but in another tone, is produced when we experiment with the tail-feathers of other kinds of Snipe. But in *S. major*, *capensis*, and *frenata* are found four humming-feathers (*surr pennor*) on each side, which are considerably shorter than in the species we have been speaking of. *Scolopax javensis* has eight on each side, which are extremely narrow and very stiff.

Since in both sexes these feathers have the same form, it is clear that both can produce the humming noise ; and by means of experiment I have convinced myself that it is so. But as the feathers of the hen are generally less than those of the cock bird, the noise also made by them is not so deep as in the other case. Professor Nilsson announces, that in the female of the Single Snipe a neighing noise has been already observed.

It would be interesting if travelling ornithologists would in future make observations on the foreign species in a state of nature. It ought to be found that these also have a neighing or humming noise, but differing considerably from that of our species.

Besides the significance which these tail-feathers have as a kind of musical instrument, their form may give a very weighty character in the determination of species standing very near one another, which have been looked upon as varieties.

To call attention to this subject, I have caused to be drawn the tail-feathers of several species. They are the following :—

Fig. 1. *Scolopax (Telmatias, Boie) gallinago*, L.



Fig. 2. *Scolopax (Telmatias) capensis*.



Fig. 3. *Scolopax (Telmatias) frenata*, Illig.Fig. 4. *Scolopax (Telmatias) javensis*.Fig. 5. *Scolopax (Telmatias) major*, L.Fig. 6. *Scolopax (Philolinnos, Brehm) gallinula*, L.

The structure of the tail-feathers in the last-named species differs considerably from that of the others ; it gives upon experiment no humming sound ; and all the feathers of the tail are, as in *Scolopax rusticola*, formed pretty much like one another.

If it be considered desirable to divide the Linnean genus *Scolopax* into subgenera, I should propose to class those together which have musical feathers in the tail, under the name *Odura*.

The interesting discovery recorded in the above paper was first announced by M. Meves in an account of the birds observed by himself during a visit to the island of Gottland in the summer of the year 1856, which account appeared in a publication of the Vetenskaps Akademi at Stockholm the following winter.

In the succeeding summer M. Meves kindly showed me his experiments. The mysterious noise of the wilderness was reproduced in a little room in the middle of Stockholm. First the deep bleat now shown to proceed from the male Snipe, and then the fainter bleat of the female, both most strikingly true to nature, neither producible with any other feathers than the outer ones of the tail.

I could not resist asking M. Meves the impertinent question, how, issuing forth from the town for a summer ramble, he came to discover what all the field-naturalists and sportsmen of England and other countries had, for the last century at least, been in vain trying to make out, straining their eyes, and puzzling their wits? He freely explained to me how, in a number of 'Naumannia,' an accidental misprint of the word representing tail-feathers instead of wing-feathers—a mistake which another author took seriously, and ridiculed—first led him to think on the subject. He subsequently examined in the Museum the tail-feathers of various species of Snipe, remarked their structure, and reasoned upon it. Then he blew upon them, and fixed them on levers that he might wave them with greater force through the air; and at the same time he made more careful observations than he had before done of the living birds in the breeding season. In short, in him the obscure hint was thrown upon fruitful ground, whilst in a hundred other minds it had failed to come to life. At my invitation, M. Meves wrote for the Zoological Society of London the paper which I have here translated.

JOHN WOLLEY.

April, 1858.

2. SYNOPSIS OF THE AMERICAN ANT-BIRDS (FORMICARIIDÆ).
BY PHILIP LUTLEY SCLATER, M.A., F.L.S., ETC. (PART I,
CONTAINING THE THAMNOPHILINÆ.)

(Aves, Pl. CXXXIX.-CXL.)

Although Prince Max von Neuwied and M. d'Orbigny both recognized the error of separating the genera *Thamnophilus* and *Conopophaga* from their natural allies the *Formicarii*, and placing them, one in the family *Laniidæ*, and the other among the *Muscicapidæ* (as has been done by Swainson and other authors), Müller, in his celebrated article "Ueber die bisher unbekannten typischen Verschiedenheiten der Stimmorgane der Passerinen," was the first to constitute this and the other peculiar groups of American *Tracheophonæ* on an intelligible basis. Cabanis and Burmeister have since followed out Müller's ideas, and reduced the genera belonging to this family into a better-organized series. The arrangement of these birds, employed in the present attempt at a synopsis of the numerous and very imperfectly known species, does not materially differ from that which the latter of these authors has employed in his 'Uebersicht der Thiere Brasiliens.' In one respect, however, I have adhered more closely to Müller's ideas; that is, in excluding the genus *Scytalopus* and its allies, for which Müller created the family name "*Scytalopidæ**." I have already stated in these Proceedings†, that

* More correctly written *Scytalopodidæ*—the derivation being σκύταλον and ποὺς, ποδός.

† See P. Z. S. 1858, p. 69.

these birds (which, I think, are more correctly denominated "*Pteroptochidæ*" from the oldest genus) seem to me to form a division rather parallel than subordinate to the family *Formicariidæ*, and therefore I have not included them in this synopsis.

But after this exception, there appears to remain a very natural group of birds, found only, as is usually the case with natural groups, within a limited geographical area, and of which the different members, although so varied in form as to be with difficulty comprehended in very precise family characters, yet present such an amount of coherence *inter se*, that it is impossible to remove any portion of them from the series without doing violence to their obviously natural affinities. For these birds I employ, following Mr. Gray's example, the name "*Formicariidæ*," derived from *Formicarius*—Boddaert's Latinized term for Buffon's Fourmillier, and therefore to be preferred to "*Myiotheridæ*" and other derivatives of subsequently given appellations of the same genus.

"This family," says M. D'Orbigny, who, as I have already observed, takes the same view of its limits as is here adopted, "appears to us the most natural possible; for it contains only birds who live, so to say, together in the same localities. Very different from the Shrikes of the Old World, which keep upon the outside of the trees, or at least of the bushes; and from the *Cyclorhines* and *Vireones*, which resemble them in habits,—these are all bush-birds *par excellence*, and inhabit the densest parts of the thorns and thickets. In comparing them with the Shrikes (*Lani*) we find that the *Thamnophil* resemble them in their hooked and toothed bill, and their long and graduated tail, but that they differ essentially in the shortness of their rounded wings, which causes them to be sedentary and not birds of travel, and in their long and slender tarsi and toes, which connect them with the purely terrestrial species—that is, with the Formicarians, to which they are intimately united by insensible passages. In fact, in passing from *Thamnophilus*, with its strong beak, to *Formicivora*, one finds throughout the same habits and the same way of life." "Again," says the same experienced observer, "we repeat that all the species of this family, independently of their being of the same habits, have a *facies* which unites them together. Their most salient traits are the long slender tarsi and toes, the exterior toe united to the middle at its base, the moderate claws, the fine elongated feathering of the rump, and in particular the spots of white which occupy the base of the interscapularies in the males of nearly all the species." It would be easy to produce other testimony—such as that of Prince Max of Neuwied, Burmeister, &c., in fact, of every observer who has seen these birds in their native wilds, as to the general resemblance of their habits; and this is, without doubt, a strong argument in favour of their constituting a natural and independent family. And their structure, when accurately examined, will be found to be very different from that of the *Laniidæ*, *Turdidæ*, and *Muscicapidæ* of the Old World, among which three families the component genera of this group are unnaturally distributed by many systematists.

Following then nearly the arrangement of Burmeister, already alluded to, we can separate the *Formicariidæ* into three divisions, which, although some of the genera in each are rather forms of transition from one to the other, may, I think, be most conveniently regarded as so many subfamilies. The first of these, the *Thamnophilinæ*, contains the largest and strongest birds of the group; and it is easy to conceive that a writer unacquainted with the intermediate links which bind *Batara cinerea* and other strongly formed species to their "weaker brethren," would at the first sight of the formidable bill be inclined to locate them among the *Laniidæ*. But the graduated series that connects these with the more typical Formicarians follows in a succession so regular that the real difficulty is rather to decide where the most salient breaks occur, and where one genus ends and the next begins. The *Thamnophilinæ* are characterized by their strong, deep, and compressed bill, which is hooked at the tip and notched; their short rounded wings; their long, broad-feathered, much-rounded tail, and strongly formed feet, with the tarsi rather elongated, and both the acrotarsia and the paratarsia divided, and the outer toe showing some signs of conjunction with the middle. The sexes of the birds of this division are always of very different colours, the males being varied with black and white, the females with brown. In the second subfamily—the *Formicivorinæ*—we find a series of smaller and more feebly formed species, which are appropriately denominated by Swainson Ant-wrens. These have the bill much more slender, not usually compressed, but as broad as it is deep, and often much elongated; the tip of the upper mandible is but very slightly hooked, and the final tooth often nearly obsolete. The wings are short and rounded. The tail varies much, being in some genera very long, and in others extremely short. The tarsi are much more slender than in the *Thamnophilines*; the outer toe rather more closely connected with the middle. The sexes are (with but few exceptions) different, as in the *Thamnophilinæ*. The members of the third subfamily, or *Formicariinæ*, are more Thrush-like in appearance, and are, again, more strongly formed but entirely terrestrial species, whence they are named by D'Orbigny "Pourmilliers marcheurs," or *Ambulatores*. In accordance with these habits, the tarsi are much lengthened, the feet rather large, and the toes long. The tail is always short and small, and nearly square at the termination. The wings are short as before. The bill is rather variable, being in some genera broad, in others rather thick and strong. The sexes of these birds are usually coloured alike. In life, I believe, they carry their tail upright or even inclined forwards, like the Wrens, in which respect, as in general conformation, they much resemble the birds of the nearly allied family *Pterotochidæ*.

The *Formicariidæ* are a strictly Neotropical group, occupying the same area as the *Cotingidæ*, the *Momotidæ*, the *Galbulidæ* and other characteristic families of this fauna. The most northern locality in which I have ascertained their occurrence is in the State of Vera Cruz, in the *tierra caliente* of Mexico, where M. Sallé found

four species — *Thamnophili melanurus* and *doliatus*, *Formicarius moniliger*, and *Grallaria guatemalensis*. They are numerous in the interior of New Granada, and most abundant in the great valley of the Amazon, particularly in the region traversed by the upper confluent of the great stream. A collection of birds from the Rio Napo (which I lately had the pleasure of bringing before the notice of this Society*) contained upwards of thirty species of these birds from this single locality. They extend all over the interior of Peru and Bolivia—rarely ascending the slopes of the Andean range above 5000 feet, the limit of D'Orbigny's lowest zone, and not observed by him southward of 23° south lat. On the Atlantic coast, however, they certainly go further south, as I have seen several species of *Thamnophilus* in collections from the Rio Grande do Sul (32° south lat.); and Mr. Darwin† procured specimens of a *Thamnophilus* which has been referred to *Thamnophilus doliatus*, at Maldonado, in the republic of Uruguay, nearly three degrees further south. On the western side of the Andes they are only met with in the republics of Ecuador and New Granada. Neither Tschudi in Peru nor D'Orbigny in Bolivia mentions their occurrence on the Pacific side of the range.

The principal particular accounts which have been written of the American Formicarians are Ménétries's "Monographie des Myiothères," in the first volume of the sixth series of 'Memoirs of the Imperial Academy of Sciences of St. Petersburg' (1835), and Cabanis's sketch of this family in his "Ornithologische Notizen," published in Wiegman's 'Archiv für Naturgeschichte' for 1844. The first of these authors enumerates forty-five species of these birds (excluding the species of the Old World and the *Pteroptochidæ*); the second does not enter at full length into the species, but only gives a list of them in some particular genera.

In 1855 I communicated a paper on the species of the genus *Thamnophilus* to the 'Edinburgh New Philosophical Journal,' New Series. With the exception of separating off the somewhat abnormal species *T. cinereus* and *T. lineatus*, I have in the present synopsis adhered pretty much to the arrangement there given. I have however thought it best to exclude from every part of the present systematic arrangement the species of which I have not myself examined specimens, and to place them in an appendix. In so doing I need hardly say I intend no disrespect to the authors who have described these species; but I merely wish to indicate that I have not been fortunate enough to meet with specimens answering to their characters, although many of them, no doubt, are founded on existing species.

My own collection of these birds numbers about 223 specimens, belonging to 112 species. The public collections to which I have most frequently referred are those of the British Museum, and the Jardin des Plantes at Paris, which both contain fine series of

* See *antea*, p. 59.

† Darwin, in *Voy. 'Beagle,' Birds*, p. 58.

these birds, particularly the former; and were it not for the unrestricted access to specimens which I have enjoyed through the kindness of the authorities of these institutions, it would have been quite useless for me to have attempted to work out the complicated species of this group.

Fam. FORMICARIIDÆ.

Rostrum brevius aut vix longius quam caput, rectum aut paulo incurvum, mandibulæ superioris apice plus minusve inflexo et dente finali instructo; gonyde recta aut leniter ascendente; rictu plerumque glabro; naribus ovalibus, basalibus, plerumque nudis, interdum membrana partim obtectis: alæ breves, rotundatæ, e primariis decem, secundariis novem; remige prima brevi, tertiam partem remigis longissimæ haud attingente; secunda et tertia brevioribus quam quarta quinta et sexta; his fere æqualibus et longissimis: cauda e rectricibus plerumque duodecim, non raro decem; uropygii plumis laxis elongatis: pedes plus minusve validi; digito exteriori cum medio plus minusve conjuncto: ptilosis inornata, nigra, olivacea, brunnea aut schistacea, nunquam e coloribus lætis.

Subfam. I. THAMNOPHILINÆ.

Rostrum forte, altum, compressum, mandibulæ superioris apice uncinato et distincte dentato: naribus ovalibus, basalibus, nudis: pedes validi, acrotarsiis et paratarsiis divisis: alæ breves rotundatæ: cauda elongata, rotundata: statura major: sexus diversi, ptilosis marium albo-nigra, fæminarum olivacea et brunnea; mares macula ad interscapulariarum basin alba plerumque ornati.

Genus I. CYMBILANIUS.

Cymbilanius, G. R. Gray, List of Gen. p. 49 (1840).

Statura modica: rostrum breve, latum, tumidum: gonyde ascendente.

1. CYMBILANIUS LINEATUS.

Thamnophilus lineatus, Vieill. Nouv. Dict. iii. p. 318; Puch. Arch. Mus. Par. vii. p. 351.

Lanius lineatus, Leach, Zool. Misc. pl. 6.

Thamnophilus lineatus, Gray, Gen. B. i. p. 298; Sclater, Edinb. Phil. Journ. n. s. i. p. 231.

Cymbilanius lineatus, Gray, List of Gen. 1840, p. 49; Bp. Cousp. p. 197.

♂. *Supra niger, albo anguste transvittatus: pileo nigro: subtus albo-cinereus, nigro confertim transvittatus.*

♀. *Pileo rufo: fasciis corporis superi et colore corporis inferi rufescentibus.*

Long. tota 6·5, alæ 3·0, caudæ 3·0.

Hab. Cayenne; Upper Amazon; Ecuador, prov. Quixos.

Mus. Brit., P. L. S.

Genus II. BATARA.

Batara, Less. Trait. d'Orn. i. p. 347 (1831).

Statura maxima : rostrum elongatum, valde compressum, fortiter uncinatum.

1. BATARA CINEREA.

Thamnophilus cinereus, Vieill. N. D. d. H. N. xxxv. p. 200 (♂);
Sclater, Edinb. Phil. Journ. n. s. i. 229.

Thamnophilus rufus, Vieill. ibid. (♀).

Lanius undulatus, Mikan, Del. Faun. Bras. pl. 2.

Thamnophilus undulatus, Burm. Syst. Ueb. iii. 89.

Thamnophilus cristatellus, Vieill. Enc. Méth. p. 749; Puch. Arch.
Mus. Par. vii. p. 354.

Thamnophilus vigorsii, Such, Zool. Journ. i. p. 557. pls. 7 & 8.

Thamnophilus gigas, Sw. Class. B. ii. 220.

Vanga striata, Q. & G. Voy. Uran. Ois. pls. 18 & 19.

Batara striata, Less. Tr. d'Orn. p. 347.

♂. *Cinereus* : pileo cristato nigro : dorso alis et cauda nigris,
albo transfasciatis.

♀. *Pileo antice castaneo* : fasciis ferrugineis neque albis, subtus
albo-cinerea, ventre brunnescente.

Long. tota 14·0, alæ 5·0, caudæ 7·0.

Hab. South-eastern Brazil : Minas Geraes, S. Paolo ; Rio Grande
do Sul (*Plant*).

Mus. Brit., P. L. S.

Genus III. THAMNOPHILUS.

Taraba, Less. Trait. d'Orn. i. p. 376 (1831).

Diallactes, Reichb. Av. Syst. Nat. pl. lxxi. (1850).

Nisius, Reichb. ibid.

Othello, Reichb. ibid.

Statura media aut minor : rostrum brevius quam caput, uncinatum : alarum remigibus quarta, quinta et sexta longissimis.

a. NISIUS.

Statura major : rostrum forte, uncinatum : cauda elongata.

1. THAMNOPHILUS LEACHI.

Thamnophilus leachi, Such, Zool. Journ. i. p. 588 (♂); Jard. &
Selb. Ill. Orn. pl. 41; Sclater, Edinb. N. Phil. Journ. i. p. 230;
Burm. Syst. Ueb. iii. 90.

Thamnophilus ruficeps, Such, Zool. Journ. i. p. 589 (♀).

Lanius variolosus, Licht. in Mus. Berol.

Lanius funebris, Cuv. in Mus. Par.; Puch. Arch. d. Mus. vii.
324.

♂. *Niger*, supra albo ocellatus : ventris plumis albo stricte marginatis.

♀. *Nigra, ferrugineo ocellata : pileo ferrugineo striato.*
 Long. tota 10·5, alæ 3·5, caudæ 5·0.
Hab. South-eastern Brazil, Minas Geraes (Such); Rio Grande do Sul (Plant).
Mus. Brit., P. L. S.

2. THAMNOPHILUS SEVERUS.

Thamnophilus lineatus, Vieill. Nouv. Dict. iii. 316 (?).
Lanius severus, Licht. Doubl. p. 45.
Thamnophilus niger, Such, Zool. Journ. i. p. 589 (♂); Jard. Selb. Ill. Orn. pl. 21.
Thamnophilus swainsoni, Such, Zool. Journ. i. p. 556. pl. 5.
Thamnophilus othello, Less. Cent. Zool. p. 65. pl. 19.
Batara othello, Less. Tr. d'Orn. p. 347.
Thamnophilus severus, Gray, Gen. i. p. 297; Sclater, Edinb. Phil. Journ. i. p. 230; Burm. Syst. Ueb. iii. 90.

♂. *Niger unicolor, cristatus.*
 ♀. *Pileo cristato rufo : corpore nigro et fulvo confertim transvittato : cauda nigra, obsolete transfasciata.*
 Long. tota 8·5, alæ 3·5, caudæ 4·5.
Hab. South-eastern Brazil, S. Paolo (Licht.); Minas Geraes (Such).
Mus. Brit., P. L. S.

3. THAMNOPHILUS GUTTATUS.

Thamnophilus guttatus, Vieill. Nouv. Dict. iii. 315; Puch. Arch. Mus. Par. vii. p. 324; Spix, Av. Bras. ii. pl. 35. fig. 1 (♀); Max. Beitr. iii. 1019.
Lanius meleager, Licht. Doubl. p. 46.
Thamnophilus maculatus, Such, Zool. Journ. i. p. 557. pl. 6.
Thamnophilus meleager, Gray, Gen. i. p. 297; Sclater, Edinb. Ph. Journ. i. 231; Burm. Syst. Ueb. iii. 91.
Lanius maculatus, Cuv. in Mus. Par.; Puch. Arch. Mus. vii. 328.
 ♂. *Supra niger, albo guttatus; subtus albus : alis et cauda nigris, albo transfasciatis.*
 ♀. *Guttis et fasciis fulvidis; abdomine pallide ochraceo.*
 Long. tota 9·0, alæ 3·5, caudæ 4·0.
Hab. South-eastern Brazil: Espiritu S^{to}, Bahia, and Minas Geraes (Max.); S. Paolo (Licht.).
Mus. Brit., P. L. S.

4. THAMNOPHILUS FULIGINOSUS.

Thamnophilus viridis, Vieill. Nouv. Dict. iii. p. 318, et Enc. Méth. p. 743; Puch. Arch. M. P. vii. p. 354 (♀).
Lanius lunulatus, Cuv. in Mus. Paris. (♀); Less. Tr. d'Orn. p. 375. pl. 45. fig. 2.
Thamnophilus lunulatus, Sclater, Edinb. N. Phil. Journ. i. p. 232 (1855).

Thamnophilus fuliginosus, Gould, P. Z. S. 1837, p. 80 (♂); Gray, Gen. i. p. 298; Sclater, Edinb. N. Phil. Journ. i. p. 234.

South American Strike, Lath. G. H. ii. p. 79.

♂. *Cinereus, gutture et capite cristato nigris: cauda obsolete transfasciata.*

♀. *Læte rufa: corpore subtus albo nigroque confertim transfasciata: cauda nigricante, albo obsolete transfasciata.*

Long. tota 8·5, alæ 3·7, caudæ 3·0.

Hab. Cayenne; British Guiana.

Mus. Brit., Derb., P. L. S.

From examination of several specimens in intermediate states of plumage, it appears evident that Lesson's *T. lunulatus* is the female of the *T. fuliginosus* of Mr. Gould. I have adopted the latter name for this species, although not the most ancient, because the former is only applicable to the female.

b. TARABA.

Statura modica: cauda minus elongata.

5. THAMNOPHILUS MAJOR.

Batara el major, Azara, Apunt. no. 218, unde.

Thamnophilus major, Vieill. Nouv. Dict. iii. 313; Enc. Méth. p. 744; d'Orb. Voy. p. 166; Schomb. Reisen, iii. p. 607; Bp. Consp. p. 198; Sclater, Edinb. N. Phil. Journ. n. s. i. p. 232.

Th. stagurus, Max, Beitr. iii. 990; Gray's Gen. p. 297; Burm. Syst. Ueb. iii. p. 92.

Th. albiventer, Spix, ii. p. 23, pl. 32 (♂ and ♀).

Th. bicolor, Sw. Zool. Journ. ii. 86 (♂); Orn. Dr. pl. 60; Gray's Gen. i. p. 297.

Th. cinnamomeus, Sw. Zool. Journ. ii. p. 87 (♀); Gray's Gen. p. 297.

"*Th. magnus*, Wied.," Less. Tr. d'Orn. p. 375.

Lanius stagurus, Licht. Verz. d. Doubl. p. 46.

♂. *Niger, subtus albus; alarum tectricibus albo marginatis; caudæ rectricibus lateralibus albo guttatis.*

♀. *Rufa, subtus alba.*

Long. tota 7·0, alæ 3·7, caudæ 3·0.

Hab. Trinidad, Guiana (*Schomb.*); Brazil, Para (*Wallace*); Pernambuco (*Spix*); Bahia (*Licht.*); Rio Belmonte (*Max*); Bolivia, Yungas, Cochabamba, Santa Cruz de la Sierra, and Chiquitos (*D'Orb.*); Paraguay (*Azara*); Argentine Rep., Santa Fé, and Corrientes (*D'Orb.*).

Mus. Brit., P. L. S.

6. THAMNOPHILUS MELANURUS.

Thamnophilus major, Tsch. Av. Consp. in Wieg. Arch. 1844, p. 277; Faun. Per. p. 170.

Thamnophilus melanurus, Gould, Ann. N. H. ser. 2. xv. p. 345; No. CCCLX.—PROCEEDINGS OF THE ZOOLOGICAL SOCIETY.

P. Z. S. 1855, p. 69. pl. 83; Sclater, Edinb. N. Phil. Journ. i. p. 233;
P. Z. S. 1856, p. 142, et 1857, p. 203.

♂. *Niger, subtus albus; tectricibus alarum albo marginatis; cauda nigra immaculata.*

♀. *Rufa, subtus alba.*

Long. tota 8·5, alæ 3·7, caudæ 3·3.

Hab. Eastern Peru (*Tsch.*); River Ucayali (*Hauxwell*); New Granada, Bogota; Panama, Chiriqui (*Bridges*); S. Mexico, prov. Vera Cruz (*Sallé*); Rio Napo.

Mus. Brit.

7. THAMNOPHILUS TRANSANDEANUS.

Thamnophilus transandeanus, Sclater, P. Z. S. 1855, p. 18; Edinb. N. Phil. Journ. i. p. 233.

♂. *Niger, subtus albus: tectricibus alarum et crisso nigris albo marginatis: cauda nigra, rectricibus duabus utrinque extimis macula parva terminali alba præditis.*

Long. tota 8·0, alæ 3·7, caudæ 3·2.

Hab. Guayaquil (*Barclay*).

Mus. Brit.

8. THAMNOPHILUS CORVINUS.

Thamnophilus corvinus, Gould, P. Z. S. 1855, p. 69; Ann. N. H. ser. 2. xv. p. 345; Sclater, Edinb. N. Phil. Journ. i. p. 234; P. Z. S. 1858, p. 65.

♂. *Ater: campterio summo niveo.*

Long. tota 7·0, alæ 3·5, caudæ 2·5, rostri a rectu 1·0.

Hab. Eastern Peru, River Ucayali (*Hauxwell*); Ecuador, Rio Napo.

Mus. Brit., P. L. S.

9. THAMNOPHILUS MELANOCEPS.

Thamnophilus melanocephus, Spix, Av. Bras. ii. p. 28. pl. 39. f. 1; Sclater, P. Z. S. 1857, p. 133, et 1858, p. 65.

Saturate ferrugineus, subtus magis cinnamomeus, capite toto cum gutture nigris.

Long. tota 6·5, alæ 3·2, caudæ 2·4, rostri a rectu 1·0.

Hab. Sarayaçu on the Ucayali (*Cast. et Dev.*); Eastern Ecuador, Quixos.

Mus. Paris., P. L. S.

This is very likely to be the female of the preceding species; but the dimensions of my specimens of each do not quite agree, and I am afraid to unite them until I obtain further evidence on the subject.

10. THAMNOPHILUS MELANOTHORAX.

Thamnophilus melanothorax, Sclater, P. Z. S. 1857, p. 133.

Supra intensæ castaneus, remigibus alarum intus nigricanti-brun-

neis, lateribus capitis et corpore subtus ad imum pectus atris, hoc colore in ventrem sensim dilutiore : ventre et lateribus olivascanti-brunneis rufo tinctis : cauda unicolore castanea : rostro corneo : pedibus nigro-fuscis.

Long. tota 6·5, alæ 3·2, caudæ 2·8.

Hab. South America.

Mus. Brit.

I have not yet succeeded in meeting with other examples of this curious species.

11. THAMNOPHILUS HYPERYTHRUS.

Thamnophilus hyperythrus, Gould, Ann. N. H. ser. 2. xv. p. 346; P. Z. S. 1855, p. 70; Selater, Edinb. Phil. Mag. i. p. 235.

♂. *Schistaceus, alis caudaque nigris, alarum tectricibus albo guttatis : subtus saturate ferrugineus.*

♀. *Obscurior, colore corporis inferi valde dilutiore.*

Long. tota 7·0, alæ 3·2, caudæ 2·3.

Hab. Chamicurros on the Huallaga (Hauzwell); Pebas, Upper Amazon (Cast. et Deville).

Mus. Brit., Paris.

12. THAMNOPHILUS LUCTUOSUS.

Lanius luctuosus, Licht. Doubl. p. 47.

Thamnophilus luctuosus, Tsch. Faun. Per. p. 172; Selater, Edinb. Phil. Journ. i. 234; Burm. Syst. Ueb. iii. 93.

Lanius melas, Cuv. in Mus. Par.; Puch. Arch. Mus. vii. p. 328. pl. 17. f. 1.

♂. *Niger cristatus : alarum tectricibus supra et infra cum caudæ apice albis.*

Long. tota 6·7, alæ 3·2, caudæ 2·5.

Hab. Eastern Peru (Tsch.).

Mus. Brit.

c. THAMNOPHILUS.

Statura minor : forma debilior : rostrum minus uncinatum.

Div. a. *Species ptilosi marium nigra aut obscura, subunicolor.*

13. THAMNOPHILUS IMMACULATUS.

Thamnophilus immaculatus, Lafr. R. Z. 1845, p. 340; Gray, Gen. B. iii. App. p. 14; Selater, Edinb. N. Phil. Journ. i. p. 249.

♂. *Niger : campterio summo partim albo.*

♀. *Brunneo-cinnamomea ; fronte, loris, genis gutture et cauda tota nigro-ardesiaceis.*

Long. tota 6·5, alæ 3·3, caudæ 3·0.

Hab. New Granada, Bogota; Ecuador, western base of Andes near Quito (Jameson).

Mus. P. L. S.

14. THAMNOPHILUS ÆTHIOPS.

Thamnophilus æthiops, Sclater, P. Z. S. 1858, p. 65.

♂. *Ater unicolor; campterio et tectricibus subalaribus albo variegatis; rostro et pedibus nigerrimis.*

♀. *Castaneo-brunnea unicolor, alis intus obscurioribus; maculis quibusdam tectricum superiorum majorum apicalibus cum campterii margine et tectricibus subalaribus flavicanti-rufis; cauda nigra.*

Long. tota 6·0, alæ 2·8, caudæ 2·5, rostri a rictu ·85, tarsi ·9.

Hab. Eastern Ecuador, Rio Napo.

Mus. P. L. S.

15. THAMNOPHILUS BRIDGESI.

Thamnophilus bridgesi, Sclater, P. Z. S. 1856, p. 141.

♂. *Fumoso-brunneus, capite nigro, albo striato: alis nigris, albo guttatis: caudæ rectricibus lateralibus nigro terminatis: gula et pectore toto nigricantibus, albo striatis.*

Long. tota 6·7, alæ 2·8, caudæ 2·5.

Hab. Chiriqui, David (*Bridges*).

Mus. Brit.

16. THAMNOPHILUS CÆSIUS.

Petit merle brun à gorge rousse de Cayenne, Buff. Pl. Enl. 644. fig. 1 (♀).

Turdus rufus, Boddaert, Table des Pl. Enl.

Turdus rufifrons, Gmel. et auct. (♀).

Lanius cæsius, Cuv. in Mus. Paris (♂); Puch. Arch. vii. p. 330.

Thamnophilus cæsius, Sclater, P. Z. S. 1855, p. 19; Edinb. N. Phil. Journ. i. p. 284.

♂. *Nigro-plumbeus, pileo cristato et gula nigris: tectricum alarum marginibus anguste albis.*

♀. *Fusca, pileo nigricante: capitis lateribus, tectricum alarum marginibus et corpore subtus rufis.*

Long. tota 5·5, alæ 3·25, caudæ 2·25.

Hab. Cayenne; British Guiana.

Mus. Brit., P. L. S.

Div. β. *Species ptilosi marium cinerea, alis caudaque albo marginatis.*

17. THAMNOPHILUS NIGRO-CINEREUS.

Thamnophilus nigro-cinereus, Sclater, P. Z. S. 1855, p. 18. pl. 81; Edinb. N. Phil. Journ. i. p. 246.

♂. *Cinereus, capite toto cum dorso summo et gutture nigris; intercapularibus ad basin albis; alis caudaque nigricantibus, albo limbatis; rectrice una utrinque extima media albo notata.*

♀. *Rufa-brunnea*; *gula et ventre medio albescentioribus*; *alarum tectricibus secundariisque et cauda, sicut in mari, albo notatis.*

Long. tota 5·75, alæ 3·8, caudæ 2·4.

Hab. Northern Brazil, Para.

Mus. Brit., P. L. S.

18. THAMNOPHILUS NÆVIUS.

Spotted Shrike, Lath. Syn. i. pt. 1. p. 190, undè

Lanius navius, Gm. S. N. i. p. 308; Leach, Zool. Misc. t. 17; Licht. Doubl. p. 46.

Le Tachet, Levaill. Ois. d'Afr. ii. pl. 77. f. 1, undè

Lanius punctatus, Shaw, G. Z. viii. pt. 2. p. 327.

Thamnophilus navius, Sw. Orn. Dr. pl. 59; Schomb. Reisen, iii. p. 687; Sclater, Edinb. Phil. Journ. i. p. 242; Burm. Syst. Ueb. iii. p. 94.

Thamnophilus cærulescens, Lafr. R. Z. 1853, p. 338.

♂. *Cinereus*: *pileo nigro*: *interscapulio albo nigroque mixto*: *alis caudaque nigris albo marginatis*: *rectrice una utrinque extima in pogonio externo albo maculata.*

♀. *Pallide viridescenti-rufa, subtus dilutior*: *pileo, alis caudaque rufescentibus*: *alis caudaque sicut in mari albo notatis.*

Long. tota 5·5, alæ 2·7, caudæ 2·1.

Hab. Cayenne; British Guiana; Northern Brazil, Para; New Granada, Bogota; South-Eastern Brazil (Burm.).

Mus. Brit., P. L. S.

19. THAMNOPHILUS AMBIGUUS.

Thamnophilus navius, Vieill. N. D. iii. 316; et Enc. Méth. p. 747; Lafr. Rev. et Mag. de Zool. 1853, p. 338.

Th. ambiguus, Sw. Zool. Journ. ii. p. 91; Sclater, Edinb. N. Phil. Journ. i. p. 245.

Th. nigricans, Max, Beitr. ii. 1006; Burm. Syst. Ueb. iii. p. 96.

Th. ferrugineus, Sw. Zool. Journ. ii. p. 91 (♀)?

♂. *Cinereus, ventre albescente*: *pileo nigro*: *interscapulio nigro albo mixto*: *alis caudaque nigris albo marginatis*: *rectricibus omnibus in utroque pogonio albo maculatis.*

♀. *Pallide viridescenti-rufa, subtus dilutior*: *pileo, alis et cauda rufis, his albo terminatis.*

Long. tota 5·7, alæ 2·8, caudæ 2·3.

Hab. S. E. Brazil (Max); Minas Geraes (Such).

Mus. Brit.

20. THAMNOPHILUS PILEATUS.

Thamnophilus pileatus, Sw. Zool. Journ. ii. p. 91; Sclater, Edinb. N. Phil. Journ. i. p. 245 (♂)? Burm. Syst. Ueb. iii. p. 95.

Thamnophilus maculatus, Lafr. et D'Orb. Syn. Av. in Mag. de Zool. 1837, p. 11; D'Orb. Voy. p. 172; Lafr. Rev. et Mag. de Zool. 1853, p. 339; Sclater, Edinb. N. Phil. Journ. i. p. 246 (♀).

Thamnophilus ventralis, Sclater, Edinb. N. Phil. Mag. i. p. 244 (♂).

♂. *Cinereus, subtus dilutior, ventre medio albo : pileo subcristato nigro : interscapulio nigro albo mixto : alis caudaque nigris albo terminatis : rectricis extimæ pogonii externi dimidio apicali albo, macula subterminali nigra : rostro brevior, altiore, compressiore.*

♀. *Rufescenti-olivacea, abdomine ferrugineo : alis caudaque, sicut in mari, albo notatis, sed remigum marginibus externis rufescentibus.*

Long. tota 6·0, alæ 2·7, caudæ 2·5.

Hab. South-eastern Brazil (*Burm.*) ; Corrientes (*D'Orb.*).

Mus. Brit., P. L. S.

Prof. Burmeister has identified—perhaps correctly—my *Thamnophilus ventralis* with Swainson's *Thamnophilus pileatus* ; and I am glad to follow his lead in reducing the number of useless synonyms of supposed species of this genus. I have likewise convinced myself that the *Thamnophilus maculatus* of my "Draft Arrangement" is nothing more than the female of this species.

21. *THAMNOPHILUS AMAZONICUS.* (Pl. CXXXIX. fig. 1 ♂, fig. 2 ♀.)

Thamnophilus ruficollis, Spix, Av. Bras. ii. pl. 37. f. 1 (♀) ; Schomb. Guian. iii. 687 ; Sclater, Edinb. N. Phil. Journ. i. p. 247.

♂. *Cinereus : pileo, nucha et dorso summo, alis caudaque nigerimis : macula interscapularium magna alba : alis caudaque albo terminatis : rectrice extima item in pogonio externo medialiter albo notata.*

♀. *Rufescenti-olivacea : capite toto et corpore subtus ferrugineis, abdomine dilutior : alis caudaque sicut in mari albo notatis.*

Long. tota 5·0, alæ 2·6, caudæ 2·3.

Hab. Brazil (*Spix*) ; British Guiana (*Schomb.*) ; Upper Amazon (*Bates*).

Mus. Brit., P. L. S.

I have only lately acquired specimens of the male of this species from Mr. Bates's collections on the Upper Amazon. The British Museum have received specimens from the same source, and amongst them a young bird ; clearly showing that Spix's *T. ruficollis* is merely the female. This bird may easily be distinguished from *T. naevius* and *T. ambiguus* by the black nape and upper back in the male bird, and the very different dress of the female. Spix's name being only applicable to the female sex, I have deemed it necessary to employ a new one.

22. *THAMNOPHILUS CAPITALIS.*

Thamnophilus capitalis, Sclater, P. Z. S. 1858, p. 65.

♂. *Cinereus, alis intus obscurioribus : pileo nigro ; subtus dilutior, tectricibus subalaribus et marginibus remigum interioribus ochraceo-albidis : cauda nigricante : rostro et pedibus plumbeo-nigris.*

♀. *Umbrino-brunnea; pileo rufo; subtus dilutior, gula albicante: rostro pedibusque plumbeis, illius mandibula inferiore pallidiore.*

Long. tota 5·7, alæ 2·5, caudæ 2·0, tarsi ·75.

Hab. Rio Napo (*Verreaux*).

Mus. P. L. S.

23. *THAMNOPHILUS STRIGILATUS.*

Thamnophilus strigilatus, Spix, Av. Bras. ii. pl. 36. fig. 1.

Fuscescenti-olivacea, subtus dilutior, gutture rufescente: capitis et dorsi superioris scapis plumarum albidis: macula magna interseapulari celata castanea: alis extus et cauda rufis: rostro altiore, productiore, fortiter uncinata: cauda longiore: tarsis brevioribus.

Long. tota 6·0, alæ 2·8, caudæ 2·6, tarsi 0·8.

Hab. Rio Napo.

Mus. P. L. S.

I refer this bird (which is probably a female), not without doubt, to Spix's *Thamnophilus strigilatus*. It has a deeper and stronger bill, weaker feet and rather longer tail, than is found in the neighbouring species, and is probably generically different.

Div. γ. *Species pileo nigro, cristato.*

24. *THAMNOPHILUS ATRICAPILLUS.*

Pie-grièche huppée de Canada, Buff. Pl. Enl. 479. f. 2.

Lanius canadensis, Linn. S. N. i. 134 (♀).

Lanius atricapillus, Gm. S. N. i. 303.

Le Fourmillier huppé, Buff. H. N. iv. p. 476.

Turdus cirrhatus, Gm. S. N. i. p. 826.

Lanius pileatus, Lath. Ind. Orn. i. p. 76.

Tyrannus atricapillus, Vieill. Ois. de l'Am. Sept. pl. 48. p. 78 (♂).

Tyr. canadensis, ib. p. 79. pl. 49 (♀).

Thamnophilus cirrhatus, Schomb. Reisen, iii. p. 687.

Thamnophilus atricapillus, Sclater, Edinb. N. Phil. Journ. n. s. i. p. 240.

♂. *Cinereus, subtus albescentior: dorso medio rufescenti-brunneo: capite cristato et gutture cum pectore et ventre medio nigris: alis caudaque nigris albo marginatis.*

♀. *Crista rufa: subtus ochraceo tineta, gutture nigro striato.*

Long. tota 5·5, alæ 2·7, caudæ 2·2.

Hab. Trinidad; Cayenne; British Guiana (*Schomb.*).

Mus. Brit., P. L. S.

25. *THAMNOPHILUS CRISTATUS.*

Thamnophilus cristatus, Max, Beitr. iii. p. 1002; Burm. Syst. Ueb. iii. p. 97.

Lanius pæcilurus, Cuv. in Mus. Paris.; Puch. Archiv. Mus. Par. vii. p. 331. pl. 17. f. 2.

Similis *T. atricapillo*, sed *caudæ rectricibus maculis albis regulariter transfasciatis*.

Hab. South-eastern Brazil (*Max*).

Mus. Paris.

In my Draft Arrangement of this genus I erroneously united this species to the preceding. I have only seen the example in the Paris Museum.

26. *THAMNOPHILUS LEUCAUCHEN*.

Thamnophilus leucauchen, Sclater, P. Z. S. 1855, p. 18. pl. 79; Edinb. N. Phil. Journ. i. p. 241.

♂. *Pileo cristato cum lateribus capitis et gutture antico ad medium pectus nigris; nucha, cervice laterali et corpore subtus albis; dorso murino-brunneo; alis caudaque nigris albo limbatis; rectricis una utrinque extimæ pogonio externo medio et omnium apicibus albo maculatis; rostro et pedibus nigris.*

♀. *Crista ferruginea; subtus ochracea, gutture nigro striato, lateribus capitis et nucha ochraceis nigro mixtis.*

Long. tota 6·4, alæ 2·8, caudæ 2·5.

Hab. Eastern Peru, Upper Amazon (*Hauswell*).

Mus. P. L. S.

Distinguished from *T. atricapillus* by the white sides of the neck, brighter-brown back and the termination of the black below at the breast, instead of being produced over the middle of the belly.

27. *THAMNOPHILUS ALBINUCHALIS*.

Thamnophilus albinuchalis, Sclater, P. Z. S. 1855, p. 18; Edinb. N. Phil. Journ. i. p. 241.

♂. *Supra murino-brunneus; nucha late alba; dorsi medii pennæ albo mixtis; capite summo cristato nigro; alis fuscis, tectricibus albo limbatis; cauda nigra, rectricum omnium apicibus et una utrinque extimæ margine externo albo maculatis; subtus albus; gutture et pectore antico nigris; capitis lateribus albo mixtis.*

♀. *Supra brunnescentior, capite et cauda tota rufo-ferrugineis; nucha et corpore infra ochraceis.*

Long. tota 6·5, alæ 3·2, caudæ 2·5.

Hab. Guayaquil (*Kellett*); Island of Puna (*Barclay*).

Mus. Brit.

Obs. Species a *Thamnophilo atricapillo* nucha alba et colore corporis inferi albo nec schistaceo, a *Thamnophilo leucauchene* dorso albo mixto, crassitie majore, et nucha candidiore distinguenda.

28. *THAMNOPHILUS MELANONOTUS*.

Thamnophilus melanonotus, Sclater, P. Z. S. 1855, p. 19. pl. 80; Edinb. N. Phil. Journ. i. p. 242.

♂. *Supra niger; interscapularibus albo mixtis; dorso postico cinereo; alis nigris albo marginatis; cauda nigra, rectricum omnium apicibus et extimæ utrinque lateralis etiam pogonio ex-*

terno medio albo maculatis; subtus gutture et pectore toto nigris, abdomine cinerascenti-albo medialiter nigricante.

Long. tota 6·5, alæ 3·0, caudæ 2·5.

Hab. S. Martha, New Granada (Verreaux).

Mus. P. L. S.

I have not yet met with other examples of this apparently distinct species.

29. THAMNOPHILUS ASPERSIVENTRIS.

Thamnophilus aspersiventer, Lafr. et D'Orb. Syn. Av. in Mag. de Zool. 1837, p. 10; D'Orb. Voy. p. 171. pl. 4. fig. 1 (♂), fig. 2 (♀) (err. sub nom. *Th. schistacei*); Lafr. Rev. Zool. 1844, p. 83; Gray's Gen. i. p. 298; Sclater, Edinb. N. Phil. Journ. n. s. i. p. 242.

♂. *Niger, dorso cinerascens; interscapulo nigro, basi alba: tectricibus alarum albo marginatis: rectricum apicibus et unæ utrinque extimæ macula in pogonio externo albis: abdomine cinereo, albo et nigro quasi asperso.*

♀. *Abdomine toto rufo.*

Long. tota 6·5, alæ 2·9, caudæ 2·5.

Hab. Bolivia (D'Orb.).

Mus. P. L. S.

Div. δ. *Species ptilosi marium albo nigroque fasciata, fœminarum rufa.*

30. THAMNOPHILUS DOLIATUS.

Lanius doliatus, Linn. S. N. i. 136 (♂).

Lanius rubiginosus, Lath. Ind. Orn. Suppl. p. 18 (♀).

Pie-grièche rayée de Cayenne, Buff. Pl. Éal. 297.

Thamnophilus doliatus, Max, Beitr. iii. p. 995; Gray, Gen. i. 297; Schomb. Guian. iii. 687; Sclater, Edinb. Phil. Journ. i. 235; P. Z. S. 1856, p. 65 et 141; Bp. Notes Orn. p. 86; Gould, Zool. Voy. Beagle, Birds, p. 58; Burm. Syst. Ueb. iii. 98.

♂. *Niger albo transfasciatus; subtus albus nigro transfasciatus; pileo cristato nigro, basi albo mixta: cauda nigra, rectricibus omnibus in utroque pogonio quinque aut sex maculis albis transvittatis.*

♀. *Ferruginea, subtus pallidior: gutture nigro obsolete punctata.*

Long. tota 5·5, alæ 3·0, caudæ 2·3.

Hab. Southern Mexico (Sallé); Honduras; Veragua (Bridges); S. Martha; Trinidad; Cayenne; British Guiana; Northern Brazil; Inner Peru, r. Ucayali (Hauxwell); S.E. Brazil (Max).

Mus. Brit., P. L. S., &c.

Dr. Burmeister complains that I have unnecessarily split up the *Th. doliatus* into different species (Syst. Ueb. iii. p. 98). In my Draft Arrangement of this genus I certainly indicated seven sets of names that appeared to me to refer to different birds, though none

of them were of my creation. I have now rejected two of these, of which I have not yet seen specimens, namely *T. albicans* and *T. brevisrostris*. And having again carefully compared specimens of the other five species as here given, I cannot regard them otherwise than as distinct; and I believe Dr. Burmeister would agree with me if he were to examine them, which he acknowledges he has never had an opportunity of doing.

31. THAMNOPHILUS CAPISTRATUS.

Thamnophilus radiatus, Spix, Av. Bras. ii. p. 24. pl. 35. fig. 2 (♂), 38, fig. 1 (♀).

Th. capistratus, Less. Rev. Z. 1840, p. 226; Sclater, Edinb. N. Phil. Journ. i. p. 236.

♂. *Albo nigroque fasciatus: pileo cristato nigro: ventre medio albo: rectricibus lateralibus nigris, maculis solum in pogonio exteriore albis: rectricibus duabus mediis in utroque pogonio maculatis.*

♀. *Capite, dorso, alis caudaque ferrugineis: subtus pallide flavido-rufescens; ventre et crisso albidis.*

Long. tota 5·5, alæ 2·6, caudæ 2·3.

Hab. Brazil (Spix); Minas Geraes (Max).

Mus. Brit., P. L. S.

This species is distinguished from *T. doliatus* by its crested black head and by the want of spots on the inner webs of the lateral rectrices. Prince Max of Neuwied's bird appears to belong to the former species.

32. THAMNOPHILUS RADIATUS.

Batara listado, Azara, Pax. i. p. 196.

Thamnophilus radiatus, Vieill. Nouv. Dict. iii. 315; D'Orb. Voy. Ois. p. 168; Sclater, Edinb. Phil. Journ. i. p. 237.

♂. *Pileo cristato nigro; supra niger albo transfasciatus; infra albus fasciis angustis magis distantibus, in ventre fere evanescentibus, nigris; gutture et crisso irregulariter albo punctatis; rectricibus omnibus et in utroque pogonio albo maculatis.*

♀. *Supra ferruginea, pileo intensiore: infra pallide ochracea, gutture et ventre medio albis: lateribus capitis et nucha nigro dense striatis.*

Long. tota 6·3, alæ 2·9, caudæ 2·6.

Hab. Paraguay (Azara); Bolivia, Yungas, Santa Cruz de la Sierra, Chiquitos, and Moxos (D'Orb.).

Mus. P. L. S.

The preceding characters are taken from a pair of birds in my collection, received from Bolivia. In comparing them with the true "*doliatus*" we find the following differences:—Above, the crest is black, and wants the medial white vertical band of the "*doliatus*," and the hinder part of the neck is rather more mixed with white. Below, the plumage is much whiter, the sides of the head are striated with black, and there are black points on the throat; the black

bands on the breast are much narrower and wider apart, and grow obsolete on the belly, the middle of which is almost white. The white spots on each web of the tail-feathers are situated as in *doliatus*, but are broader and squarer in form. In the female, the plumage above agrees with *doliatus* ♀; below, the strise are confined to the sides of the throat, this and the belly in the middle being pure white, with the breast and sides pale creamy buff.

33. THAMNOPHILUS TENUIPUNCTATUS.

Thamnophilus tenuipunctatus, Lafr. Rev. et Mag. de Zool. 1853, p. 339; Sclater, Edinb. Phil. Journ. i. p. 238.

Supra nigerrimus, lineis angustis albis transversim vittatus, pileo nigro: subtus albo nigroque regulariter transfasciatus, vittis nigris paulo latioribus: cauda nigra; rectricibus in utroque pogonio lineis angustis transversis albis notatis: rostro brevior et minus alto quam in Th. doliato.

Long. tota 5·5, alæ 2·8, caudæ 2·3, tarsi 0·95.

Hab. New Granada; Bogota.

Mus. Brit.

Two specimens of this bird are in the British Museum. They agree generally with Lafresnaye's characters of *Thamnophilus tenuipunctatus*, and I am unwilling to give them a different name. But the wing-feathers are exteriorly as well as interiorly spotted in these specimens, and the inner as well as the outer webs of the tail-feathers are crossed by narrow transverse lines. These do not extend up to the shaft, but leave the web adjacent to the shaft black. As far as I can understand Lafresnaye's description, he intends to say that the tail-feathers are only spotted on the outer web; and if so, his species is perhaps different from the present.

34. THAMNOPHILUS MULTISTRIATUS.

Thamnophilus multistriatus, Lafr. R. Z. 1844, p. 82; Gray, Gen. i. p. 298; Sclater, Edinb. N. Phil. Journ. n. s. i. p. 238.

♂. *Supra niger, omnino albo transfasciatus: subtus albo nigroque alterne vittatus, gutture magis striato.*

♀. *Supra castanea, subtus ut in mari fasciata: cauda dorso concolore.*

Long. tota 4·8, alæ 2·8, caudæ 2·5.

Hab. Interior of New Granada, Bogota.

Mus. Brit., P. L. S.

This is a common Bogota species, distinguishable from *T. doliatus* by the absence or little development of crest, and the head being banded across like the back. The female is chestnut above, and banded below like the male.

35. THAMNOPHILUS PALLIATUS.

Lanius palliatus, Licht. Verz. d. Doubl. p. 46.

Thamnophilus lineatus, Spix, Av. Bras. ii. p. 42. pl. 33 (♂ et ♀); Tsch. F. P. p. 171.

- Thamnophilus fasciatus*, Sw. Zool. Journ. ii. p. 88.
Thamnophilus badius, Sw. Orn. Dr. pl. 65 (♂), 61 (♀).
Thamnophilus palliatus, Max, Beitr. iii. 1010; D'Orb. Voy.
 p. 174; Burm. Syst. Ueb. iii. 99; Sclater, Edinb. N. Phil. Journ.
 i. p. 239.

Lanius vestitus, Cuv. in Mus. Par.

♂. *Supra castaneus, pileo nigro: subtus niger albo crebro transfasciatus.*

♀. *Mari similis, sed pileo castaneo.*

Long. tota 6·5, alæ 3·0, caudæ 2·6.

Hab. South-eastern Brazil (Max); Eastern Peru (Tsch.); Bolivia (D'Orb.).

Mus. Brit., P. L. S.

36. THAMNOPHILUS TORQUATUS.

Batara acanelado, Azara, Pax. Par. no. 215?

Thamnophilus ruficapillus, Vieill. Nouv. Dict. iii. p. 318 (♀)?

- Thamnophilus torquatus*, Sw. Zool. Journ. ii. p. 89; Gray, Gen.
 i. p. 298; Sclater, Edinb. N. Phil. Journ. i. p. 239.

Lanius scalaris, Licht. in Mus. Berol.

Thamnophilus scalaris, Max. Beitr. iii. p. 999.

Thamnophilus atropileus, Lafr. & D'Orb. Syn. Av. in Mag. de
 Zool. 1837, p. 117; D'Orb. Voy. p. 173; Gray, Gen. i. p. 298.

- Thamnophilus pectoralis*, Sw. An. in Men. p. 223; Gray, Gen. i.
 p. 298.

♂. *Cinereus, pileo nigro, alis rufis: subtus albidus, pectore nigro transfasciato: cauda albo nigroque transfasciata.*

♀. *Pileo rufo, et coloribus dilutioribus.*

Long. tota 5·5, alæ 2·4, caudæ 2·2.

Hab. South-eastern Brazil (Max); Bolivia (D'Orb.).

Mus. Brit., P. L. S.

Genus IV. PYGIPTILA.

Rostrum validum, crassum, uncinatum, ad basin latius et apicem versus angustatum: tarsi brevissimis, digitum medium vix excedentibus, undique scutellatis; unguibus brevibus.

I have united under this title two birds, one of which I have previously arranged as a *Thamnophilus*, the other as a *Myrmeciza*. The strongly-hooked bill (of the first species especially) most resembles that of the *Thamnophilines*, with which also they agree in the nearly completely scutellated tarsi; whereas the lax, full feathering of the uropygium and shorter tail show some *rapprochement* towards *Hypocnemis*.

1. PYGIPTILA MACULIPENNIS.

Thamnophilus stellaris, Sclater, P. Z. S. 1854, p. 112 (nec Spixi).

Thamnophilus maculipennis, Sclater, Edinb. Phil. Journ. i. p. 248.

♂. *Cinereus*: pileo et dorso summo nigris: interscapulii basi late alba: tectricum alarium apicibus minute albo punctatis.

♀. *Fusco-cinerea*, subtus rufescens: gula et capitis lateribus dilutioribus: alis rufis.

Long. tota 5·3, alæ 3·0, caudæ 1·6, tarsi 0·8.

Hab. Upper Amazon; Rio Napo.

Mus. Brit., P. L. S.

2. PYGIPTILA MARGARITATA.

Myrmeciza margaritata, Sclater, P. Z. S. 1854, p. 253. pl. 70.

♂. *Cinereus*, subtus dilutior, ventre medio crissoque albescentibus: alis caudaque nigris; rectricum apicibus albis: remigibus secundariis et alarum atque caudæ tectricibus superioribus omnibus maculis magnis, rotundis, albis terminatis.

♀. *Fusco-brunnea*, subtus pallide cervino-rufa: maculis alarum et caudæ clare cervinis neque albis.

Long. tota 5·3, alæ 2·8, caudæ 1·8, tarsi 0·75.

Hab. Eastern Peru, Chamicurros (*Hauzwell*).

Mus. Brit., P. L. S.

Genus V. DYSITHAMNUS.

Dysithamnus, Cab. Orn. Not. p. 223 (1847).

Dasythamnus, Burm. Syst. Ueb. iii. p. 80 (1856).

Rostrum breve, rectum, compressum, minus altum quam in THAMNOPHILO: alæ breves, remigibus quarta quinta et sexta longissimis: pedes debiliores, tarsi breviores: statura minor: cauda brevis, magis æqualis, paulum rotundata.

1. DYSITHAMNUS GUTTULATUS.

Lanius guttulatus, Licht. Doubl. p. 40.

Myiothera strictothorax, Temm. Pl. Col. 179. fig. 1, 2.

Thamnophilus strictothorax, Max. Beitr. iii. 1013.

Dysithamnus guttulatus, Cab. Orn. Not. p. 223; Bp. Consp. p. 199; Burm. Syst. Ueb. iii. p. 81.

Thamnophilus striatothorax, D'Orb. Voy. p. 176.

♂. *Olivaceus*, pileo cinereo, lateribus capitis albo variis: tectricibus alarum nigris albo limbatis: subtus pallide flavus, pectore nigro guttulado.

♀. *Mari similis*, sed pileo rufo et subtus vix guttulata.

Long. tota 5·5, alæ 2·4, caudæ 1·9.

Hab. South-eastern Brazil (*Max.*); Bolivia, Cochabamba (*D'Orb.*).

Mus. Brit., P. L. S.

2. DYSITHAMNUS MENTALIS.

Myiothera mentalis, Temm. Pl. Col. 179. fig. 3.

Myiothera poliocephala, Max. Beitr. iii. p. 1098.

Thamnophilus mentalis, D'Orb. Voy. p. 177; Tsch. F. P. p. 173.

Dysithamnus mentalis, Cab. Orn. Not. i. p. 223; Bp. Consp. p. 199; Burm. Syst. Ueb. iii. p. 82.

♂. *Olivaceus; pileo cinereo; regione auriculari nigricante: alarum tectricibus albo limbatis: subtus subflavus, gutture albicante.*

♀. *Pileo rufescente.*

Long. tota 4·5, alæ 2·4, caudæ 1·8.

Hab. South-eastern Brazil (*Max*); Bolivia (*D'Orb.*); Eastern Peru (*Tsch.*).

Mus. P. L. S.

3. DYSITHAMNUS SEMICINEREUS.

Dysithamnus semicinereus, Sclater, P. Z. S. 1855, p. 90. pl. 97 et p. 147.

♂. *Cinereus, pileo saturatiore; subtus medialiter albicantior: dorso postico et ventre imo olivascentibus; alarum tectricibus albo tenuissime limbatis.*

♀. *Olivacea, pileo rufo: subtus dilutior, gutture albicante, ventre medio flavicante.*

Long. tota 4·5, alæ 2·4, caudæ 1·6.

Hab. New Granada.

Mus. Brit., P. L. S.

4. DYSITHAMNUS XANTHOPTERUS.

Dysithamnus xanthopterus, Burm. Syst. Ueb. iii. p. 81; Sclater, P. Z. S. 1857, p. 132.

♂. *Cinereus, interscapulio et alis extus castaneis: subtus albus, cervice lateraliter cinerascens, ventre ochraceus.*

♀. *Pileo rufo: subtus fusco-flavicans, medialiter dilutior.*

Long. tota 5·5, alæ 2·4, caudæ 2·0.

Hab. South-eastern Brazil (*Burm.*).

Mus. Brit., P. L. S.

5. DYSITHAMNUS PLUMBEUS.

Thamnophilus stellaris, Spix, Av. Bras. ii. pl. 36. f. 2?

Myiothera plumbea, Max. Beitr. iii. p. 1080.

Dysithamnus stellaris, Cab. Orn. Not. p. 224; Bp. Consp. p. 199; Burm. Syst. Ueb. iii. p. 83.

♂. *Plumbeus: alis caudaque nigricanti-brunneis: tectricibus alarum nigris albo terminatis.*

Long. tota 5·25, alæ 2·75, caudæ 2·0.

Hab. South-eastern Brazil (*Max.*).

Mus. P. L. S.

I have not employed Spix's name, because I am not confident that his figure is intended for this bird.

6. DYSITHAMNUS SCHISTACEUS.

Thamnophilus fuliginosus, Lafr. et D'Orb. Syn. Av. in Mag. de Zool. 1837, p. 10; D'Orb. Voy. p. 170. pl. 5. f. 1.

Th. schistaceus, D'Orb. Voy. p. 170.

Dysithamnus schistaceus, Sclater, P. Z. S. 1858, p. 66.

♂. *Plumbeus, subtus vix pallidior: rectricum marginibus apicalibus anguste albis.*

♀. *Fusco-olivacea, gutture albido: abdomine et alis subtus flavicanti-ochraceis.*

Long. tota 5·5, alæ 2·9, caudæ 1·9.

Hab. Bolivia, Cochabamba (D'Orb.); Ecuador, Rio Napo.

Mus. Brit., P. L. S.

This species seems to be best placed in the genus *Dysithamnus*. It has nearly the same form as the preceding.

7. *DYSITHAMNUS LEUCOSTICTUS* (Pl. CXL.).

Dysithamnus leucostictus, Sclater, P. Z. S. 1858, p. 66.

♂. *Supra umbrino-brunneus, pileo rufescentiore, pennis omnibus interne cinereis: subtus cinereus, capitis lateribus cum gula et pectore guttis elongatis albis, pennas medias occupantibus, maculatis: ventris lateribus et crisso olivaceo tinctis: cauda obscure nigra, extus brunneo marginata: rostro et pedibus nigris.*

Long. tota 5·2, alæ 2·75, caudæ 2·0, tarsi 1·85.

Hab. Ecuador, Rio Napo.

Mus. P. L. S.

Genus VI. *THAMNOMANES*.

Thamnomanes, Cab. Orn. Not. i. p. 230.

Rostrum dilatatum, abbreviatum, apice uncinata, setis rictalibus numerosis: uropygii plumis laxis, densissimis: ptilosis marium plumbea, fœminarum rufa.

1. *THAMNOMANES CÆSIUS*.

Lanius cæsius, Licht. Doubl. p. 46.

Muscicapa cæsia, Max. Beitr. iii. p. 826; Temm. Pl. Col. 17. f. 1, 2.

Tyrannus cæsius, D'Orb. Voy. p. 309.

Thamnomanes cæsius, Cab. Orn. Not. i. p. 230; Bp. Consp. p. 201.

♂. *Plumbeus, alarum et caudæ marginibus brunnescentibus: interscapulii plumis subtus albescentibus.*

♀. *Olivaceo-brunnea, tectricibus alarum inferioribus et corpore subtus ferrugineis.*

Long. tota 5·8, alæ 2·8, caudæ 1·5.

Hab. South-eastern Brazil (Max.); Bolivia (D'Orb.).

Mus. Brit., P. L. S.

2. *THAMNOMANES GLAUCUS*.

Thamnomanes glaucus, Cab. Orn. Not. i. p. 230; Bp. Consp. p. 201; Sclater, P. Z. S. 1858, p. 66.

Præcedenti similis, sed rostro altiore compressiore et interscapularium plumis pure albis (Cab.).

Hab. Cayenne; Rio Napo?

Mus. Berol.

My specimens from the Rio Napo must be compared with birds from Cayenne, before they can be referred without doubt to this species.

3. DESCRIPTION OF TWO NEW SPECIES OF ENTOZOA.

BY W. BAIRD, M.D., F.L.S., ETC.

(Annulosa, Pl. LII.)

In 1821 Nitzsch established a new genus of Nematoid Worms in Ersch and Gruber's Encyclopædia. This genus he named *Hedruris*, from the two Greek words *ἔδρα*, *seat*, and *οὐρά*, *tail*,—a name by which he intended to indicate the peculiar manner in which the female is attached to the stomach of the animal in which it was found. As yet there has been only one species described, *Hedruris androphora*, which was first discovered in the stomach of the fresh-water Newts, *Triton cristatus* and *Lissotriton punctatus*. The female is distinguished by having the caudal extremity swollen and terminated by a suckorial apparatus, by means of which, and with the assistance of a horny claw like the claw of a cat, it adheres firmly to the coat of the stomach of its host. The tail of the male terminates in a sharp curved point, provided with five or six papillæ disposed in a longitudinal series along the under surface. It is always found spirally twisted round the body of the female, and it is no doubt by means of these suckorial papillæ that it keeps itself attached to the female. Dujardin, in his 'Hist. Nat. des Helminthes,' hesitates where to place this genus, and arranges it in an Appendix along with several others, the true position of which he had not satisfactorily ascertained. Diesing, in his 'Systema Helminthum,' places it in the same section as, and immediately following, the genus *Ascaris*, and considers, along with Nitzsch, that the species *androphora* is identical with the *Ascaris leptocephala* of Rudolphi. In the Collection of Entozoa in the British Museum are several specimens of a small Nematoid Worm, sent under the name of *Ascaris leptocephala* to the National Collection by M. Siebold. If these are correctly named by this last-mentioned naturalist, the species *Asc. leptocephala* is a true *Ascaris*, and quite distinct from the species from which Nitzsch formed the genus *Hedruris*, a very good figure of which may be seen in the 'Allgemeine Encyclopädie' of Ersch and Gruber, vol. vi. p. 48.

A short time ago I received, through the kind attention of Sir W. Jardine, a specimen of an Entozoon which he took from the abdominal cavity of an Amphibian which has rarely found its way to this country, the *Siredon mexicanus*. Upon examination I ascertained it to be a female of a new species of this rare genus *Hedruris*. In size it is about four times longer than the *androphora*; it has a larger head, and the body more distinctly striated across. This species I have named *Hedruris siredonis*; but as only the female has been as yet discovered, I am unable to give a very detailed description of it.

Fig 1

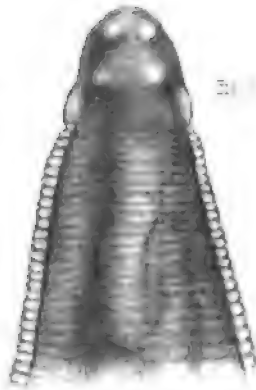


Fig 3



Fig 4



Fig 6



Fig 7

W. Westamp

HEDRURIS SIREDONIS (Pl. LII. fig. 1-4).

Female. Body 13 millimetres long, $\frac{1}{2}$ millimetre broad, strongly striated across, narrower at the anterior than the posterior extremity, this latter terminating in an obtuse point furnished with what Diesing calls a suctorial papilla, by which it adhered to the coat of the stomach of the Siredon. *Male* — ?

Hab. Stomach of the *Siredon Mexicanus* from Mexico. British Museum Collection.

Along with this interesting species, and in the abdominal cavity of the same animal, were three specimens of another Nematoid Worm of a very different form. I consider it to belong to the family *Strongylidae*, and to a genus which Dujardin established under the name of *Leptodera*, so called from the long narrow neck (*λεπτός*, narrow, *δέρον*, neck) which distinguishes the species upon which the genus was founded. Only one species of this genus has as yet been described,—the *Leptodera flexilis* of Dujardin, which was found parasitic in the vas deferens of one of the Common Slugs (*Limax cinereus*). This species is only from $2\frac{1}{2}$ millimetres (male) to 4 mill. (female) in length, whilst the new species from the Siredon measures from 25 to 16 mill.

LEPTODERA ELONGATA (Pl. LII. fig. 6-9).

Female. 25 millimetres long. Body filiform, neck long and slender; tail terminating in a long sharp point. Vulva situated about the middle of the length of the body.

Male. 16 millimetres long. Body filiform, neck long and slender, tail sharp-pointed. Spicula double, proceeding from a swelling near the commencement of the tail, and accompanied by two short membranous expansions like wings.

Hab. Abdominal cavity of *Siredon Mexicanus*. B.M. Collection.

EXPLANATION OF PLATE LII.

- Fig. 1. *Hedruris Siredonis*, natural size.
- Fig. 2. *Hedruris Siredonis*, enlarged.
- Fig. 3. Head of *Hedruris Siredonis*, enlarged.
- Fig. 4. Tail of *Hedruris Siredonis*, enlarged.
- Fig. 5. Tail of *H. androphora*, to show the claw.
- Fig. 6. *Leptodera elongata*, natural size.
- Fig. 7. *Leptodera elongata*, enlarged.
- Fig. 8. Head and neck of *Leptodera elongata*.
- Fig. 9. Tail of *Leptodera elongata*, enlarged.

4. DESCRIPTION OF NEW PINNÆ. By SYLVANUS HANLEY.

1. PINNA CAROLINENSIS. *P. testa angusto-cuneiformi, solidiuscula, olivacea, subinflata, carinae centralis experte, nisi marginem ventralem juxta undique costata: costis paucis (circa 7-10), validis, remotis, rotundatis, et squamis brevibus*

No. CCCLXI.—PROCEEDINGS OF THE ZOOLOGICAL SOCIETY.

magis minusve tubulosis instructis : costarum interstitiis latis, concavis : area ventrali angusta, sublævigata, plicis transversis aut nullis aut obsoletis : margine dorsali subrecto : margine ventrali sinuoso, ad extremitatem paululum pendulo : margine postico obtuse subtruncato, inferne (scilicet marginem ventralem versus) magis prominente.

Long. $3\frac{1}{4}$, lat. 8 poll.

Hab. Carolina, Amer. Sept.

Mus. Hanley, Cuming.

The projection of the ventral extremity of the posterior margin gives an oblique aspect to this coarse-looking shell, which has erroneously been taken for *P. seminuda* by the American conchologists : it is, however, much narrower, and more sparingly ribbed. I may here remark, that the *Pinna* usually forwarded to us by our North American friends as *P. muricata*, is the *P. squamosissima* of Philippi.

2. PINNA HYSTRIX. *P. testa tenui, late cuneiformi, carinæ centralis experte, subinflata, postice subquadrata, cornea, livido-purpurascente partim fucata, costulis multis instructa ; costulis squamis semitubulosis longis erectis confertim horridis (alternis, autem, nonnumquam muticis) ; interstitiis latis, planoconcavis, et lamellis incrementi conspicuis arcte ornatis : area ventrali lata, scabra : margine postico subtruncato : margine ventrali postice margini dorsali subrecto fere parallelo et æquali, antrosum abrupte concavo.*

Long. 6, lat. 4 poll.

Hab. Amboyua.

Mus. Cuming, Hanley.

A very beautiful shell, and remarkable, when young, for the exquisite shagreening of the very broad ventral triangle.

3. PINNA KRAUSSII. *P. testa tenui, lanceolata, cornea, fusco-purpurascente picta, carina centrali obsoleta, et costulis, quæ squamis fornicatis erectis longis sunt armatæ, instructa : interstitiis vix latis, plano-subconcavis : area ventrali angusta sublævigata, minime scabra : margine dorsali incurvato et margine ventrali subrecto subæqualibus : margine postico brevi, subtruncato.*

Long. 4, lat. 2 poll.

Hab. Natal (teste Sowerby).

Mus. Hanley, Hamilton.

From the locality, I should have suspected this might have been the lost *Afra* of Sowerby : but that celebrated conchologist gave me the species as unknown to him. Moreover the ribs are not subobsolete, the scales loose, scattered and broadish, or the hinder margin roundish, as required by the description. The painting of my own young specimen is composed of brownish liver-coloured irregular linear markings, the armed ribs are nine or ten, but incipient costellæ are manifest in their intervals, which are consequently less broad than in the preceding species.

4. *PINNA MINAX*. *P. testa rotundato-trigona, lata, crassiuscula, prorsus atro-purpurascens, subventricosa, costis depressis rotundatis squamiferis arcte instructa; squamis fornicatis (etiam marginem ventralem juxta) magnis patulis reflexis confertis et transversim subjunctis undique armata: carina centrali nulla: margine dorsali subrecto, aliquantulum brevior: margine ventrali postice subarcuato, antice abrupte concavo: margine postico latissimo, rotundato, inferne eminentiore.*

Long. $5\frac{1}{2}$, lat. 7 poll.

Hab. Nov. Guinea? Mexico?

Mus. Hanley.

The precise locality is very uncertain, the specimen (the only one I have seen) having been purchased without trustworthy authority upon that point. The scales, of which there are about eighteen rows on the ribs (which latter become nearly obsolete posteriorly), cover the entire surface, and become smaller and still more crowded near the lower margin, which they face, leaving manifest traces of their presence where abraded. The general shape and aspect is that of *P. nigra*.

5. *PINNA FUMATA*. *P. testa lanceolata, subventricosa, in medio obtuse carinata, cornea, griseo-nigrescente subradiatim nebulosa; antrorsum costellata, striolisque lamellaribus transversis arcte decussata; costellis depressis, haud remotis: area ventrali angusta, inconspicua, sublaevigata, rugis incrementi subpliciformibus obsoletis: margine dorsali et ventrali subrectis, subæqualibus: margine postico brevi, subtruncato.*

Long. $10\frac{1}{2}$, lat. $4\frac{1}{2}$ poll.

Hab. Insulæ Philippinæ.

Mus. Cuming, Hanley.

The dorsal margin is barely the longer, and, except at the extremity, scarcely concave.

6. *PINNA REGIA*. *P. testa trigona, haud angusta, satis convexa, carina centrali obtusa infirmata, corneo et purpureo-livescente transversim undulata, radiatim costata; costis paucis (circiter 8), depressis, rotundatis, remotis, et squamis patulis laxis subremotis armatis: area ventrali angusta: margine dorsali et ventrali subrectis, subæqualibus: extremitate postica convexo-subtruncata.*

Long. $3\frac{1}{2}$, lat. $7\frac{3}{4}$ poll.

Hab. Amboyna.

Mus. Cuming.

The ribs extend to nearly the ventral margin, adjacent to which are only indistinct folds of increase.

7. *PINNA ROSTELLUM*. *P. testa lanceolata, cornea, brunneo-purpurascens nebulosa, carina centrali subobtusata infirmata, antice solum costata (costis circiter 8) et lineis inconspicuis transversim rugosa; postice squamis paucis laxis patulis in super-*

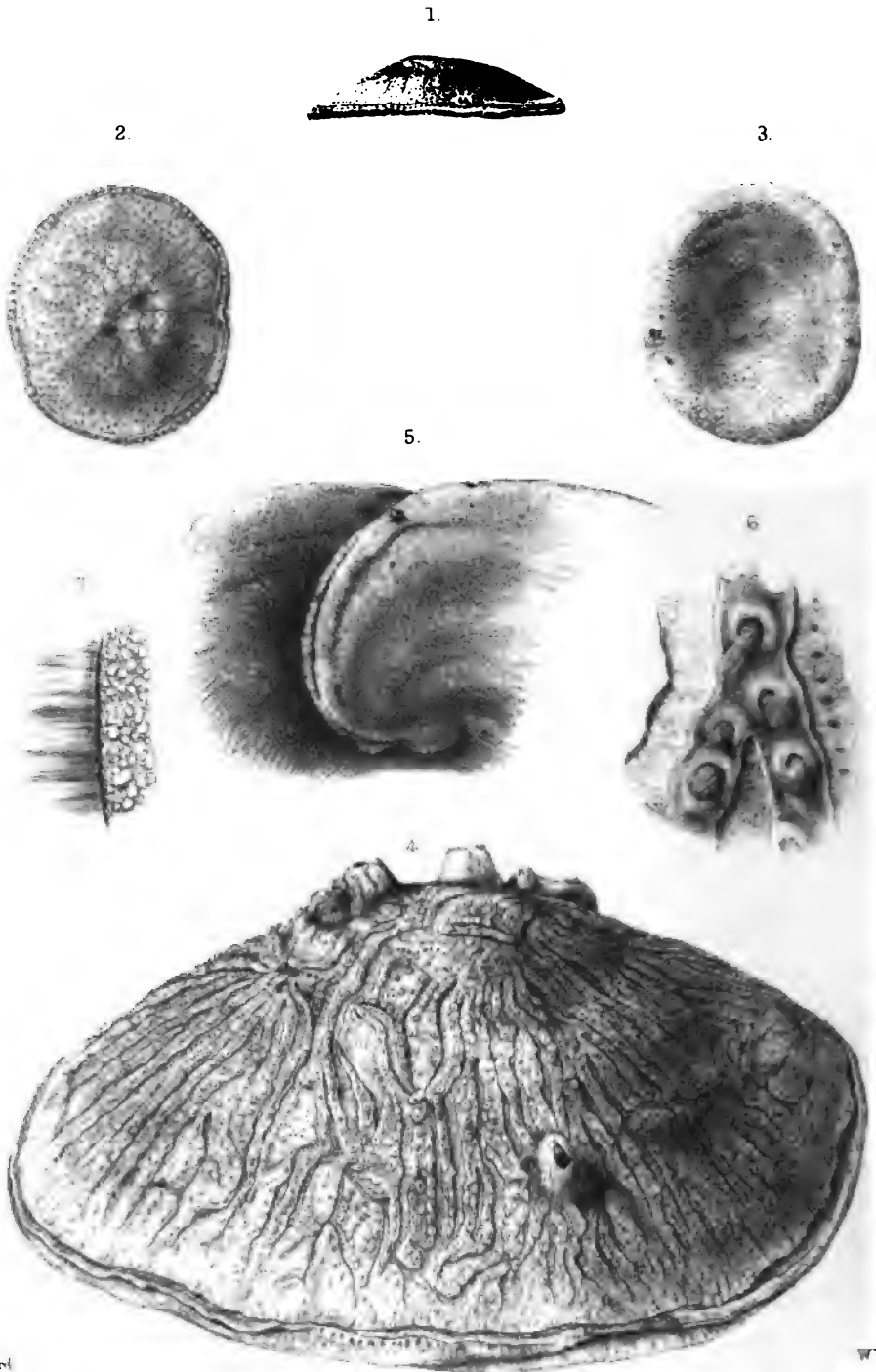
fecum elongatum subradiata : area ventrali aut angusta aut nulla, transversum subplicata ; margine dorsali elongata, subincurvato, longiore : margine ventrali subrecto, subaequali : margine postico superne breviter retuso, deinde subrecto.
 Var. : Testa cuneiformi, purpureo-fuscescente late radiata, nonnquam rufa radius saturatioribus picta ; squamis nullis ; plicis magis conspicuis : margine postico convexo.
 Long. 2½, lat. 6½ poll. Var. long. 6, lat. 9½ poll.
 Hab. Insulae Indicae.
 Mus. Hanley, Cuming (var.).

8. PINNA EUGLYPTA. *P. testa parva, pertensi, compressa, carina centrali obtusa infirmata, antice fulva, postice saturate olivacea, mutica, costellis radiantibus permultis (minimum 20) depressis convexis, et rugis transversis lamellaribus undique subcancellatis sculpta* : area ventralis nulla : margine dorsali incurvato, maxime longiore : extremitate postica oblique subtruncata.
 Long. (t. junioris) 2½, lat 4½ poll.
 Hab. Insulae Oceani Indici.
 Mus. Hanley, Cuming.

9. PINNA D'ORBIGNYI. *P. testa cuneiformi, sublanceolata, ventricosa, cornea, livido-purpurascens subradiata, carinae centralis experte, radiatum squamifera, haud autem costata ; squamis magnis, fornicatis, erectis ; superficie aliter laevigata : area ventrali inconspicua, haud plicata : margine dorsali subconcavo : margine ventrali subaequali, sinuato : extremitate postica convexo-subtruncata, haud obliqua.*
 Long. 2½, lat. 4½ poll.
 Hab. — ?
 Mus. Cuming.

(Of this I have only seen a single example, and that possibly a young one ; it is not, however, remarkably fragile. Besides the irregular squamation near its ventral edge, the area adjacent to which is evidently squamous where not rubbed, there are about ten distinct rows of coarse radiating scales, but only faint indications of distant rows near the beaks.

10. PINNA MENKEI. *P. testa cuneiformi, saepe subelongata, antice subventricosa, carina centrali obtusa infirmata, cornea, livido-purpurascens conata vel umbrosa, undique costata ; costis antice breviter subrectis, plerumque (exemplis attritis) laevibus, antice autem in exemplis illæsis, squamis fornicatis latis plicatis rugulosis subrectis instructis : area ventrali aut angusta aut nulla : margine dorsali longiore, subrecto aut incurvato, postice convexo : extremitate postica oblique subtruncata.*
 Long. 1½, lat. 1½ poll.
 Hab. Insulae Oceani Indici.
 Mus. Hanley, Cuming.



CH Ford

W. L. 1

XENOSPONGIA PATELLIFORMIS Gray

1 2 3 Young

Underside showing the lip and its fringe, natural size 6 & 7 Surface and fringe magnified

Even in worn individuals the traces of the deciduous scales are always present. There are faint transverse lamellar wrinkles : the broader extremity is not pendulous.

5. DESCRIPTION OF A NEW GENUS OF SPONGE (XENOSPONGIA)
FROM TORRES STRAIT. BY DR. JOHN EDWARD GRAY,
F.R.S., V.P.Z.S., PRES. ENT. SOC. ETC.

(Radiata, Pl. XII.)

The Sponge here described was received from Torres Strait with some very interesting Madreporæ and Polyzoa.

It is peculiar as being free like the *Fungæ* among the Madreporæ, but more concave beneath, for having the upper oscules placed in the diverging forked groove of the upper surface, and for having the whole of the under surface covered with a thick coat formed of agglutinated particles of siliceous sea-sand, this coat being much thicker than the sponge itself; and it is probably used to keep it in its place and position at the bottom of the sea.

Genus XENOSPONGIA.

Sponge free, discoidal, subcircular, concave below, convex above (rarely lobed on the side); the lower surface with a thick coat of agglutinated siliceous sand of nearly equal-sized particles; the upper surface covered with a white leathery coat formed of felted spicula, studded with round tufts of glassy spicula, the tufts of nearly equal size, formed of numerous very fine transparent filiform spicula, forming a roundish brush, each tuft surrounded at the base by a slightly raised edge of the leathery upper coat; the circumference of the disk is surrounded by a uniform series of similar tufts. The centre of the upper surface is marked with a subcentral impressed groove with raised edges enclosing a series of circular oscules; this groove sends out branches diverging towards the edge, which are forked and reforked (or rarely trifid) as the disk enlarges, until they approach the edge of the circumference, which is surrounded by two continuous circular grooves, concentric with the margin, containing between them a single circular submarginal series of tufts of spicula.

When the sponge is young, the forked diverging grooves are few, definite, and evenly spread over the surface of the disk, with several series of tufts between them; but as the sponge increases in age, the grooves become much more numerous, closer together, nearly parallel with each other, and enclosing only a single series of tufts of spicula between the parallel grooves.

The substance of the sponge between the grooves is minutely netted, the interspaces of the network being formed of bundles of very minute spicula, and with a single series of small uniform-sized, equal, roundish oscules.

The upper surface of the adult sponge is sometimes taken posses-

sion of by a species of Barnacle (*Balanus*), which forms a prominence on its surface, and is covered externally with a coat of the sponge.

XENOSPONGIA PATELLIFORMIS (Pl. XII.).

Hab. Torres Strait.

The particles of sand forming the lower coat of the sponge are as if they were imbedded in a kind of plaster, having a smooth uniform surface, exactly as if the sand had been well mixed with a small quantity of fluid mortar and then cast upon a smooth body.

The whole under surface is not perfectly smooth, but with more or less distinct impressed lines or concavities placed parallel with the circumference, showing the periodical increase in the size of the sponge.

There is scattered over the under surface of the larger specimen a few larger dark-coloured stones and a few fragments of shells, which give a variegated appearance to the coat. The larger specimen, after it had reached a certain size, made an irregular growth on one of the sides, forming two rounded lobes which overlap each other, while the whole front retains the concave conical shape.

The lobe, which is expanded on the under surface of the other, is fringed with a continuous series of very close tufts of silky spicula. I have no doubt, as the bases of these tufts are to be seen on the rest of the margin, that similar tufts occupy the whole edge of the sponge in its perfect state, and have been rubbed off; they have been retained in this place, because it is better protected from external injury than the other part of the sponge.

In the larger specimens the grooves are much more irregular, as well as more abundant and more crowded than in the smaller one; and in some few instances they appear to arise in the surface independent of any connexion with the other grooves, which is not the case in the smaller example.

In the same specimen there are a few groups or rather lines of oscules, situated on the surface of the sponge itself, and not placed in the grooves, where all the other oscules are placed.

In the diverging grooves the texture of the sponge seems to be across the grooves, that is, parallel to the outer circumference of the sponge, leaving minute square pits in the network.

In the marginal grooves, on the contrary, the chief fibres of the texture appear to be also across the groove, but that is radiating from the centre towards the margin; this appearance may probably be partly, if not entirely, arising from the manner in which the sponge has contracted when it dried, and may not be apparent in the fresh state; but having only a single specimen of the adult and young form of the sponge, I am disinclined to soak it in water and examine it in a moist state, fearing that it may spoil the specimen, which is now very brittle and inclined to crack from the edge to the centre of the frond.

6. NOTE ON A TALKING CANARY, ADDRESSED TO DR. GRAY,
V.P.Z.S. BY S. LEIGH SOTHEY.

The Woodlands, Norwood, Surrey.
March 26, 1858.

DEAR SIR,

Touching that marvellous little specimen of the feathered tribe, a Talking Canary, of which I had the pleasure a few days since of telling you, I now send you all the information I can obtain respecting it from the lady by whom it was brought up and educated at this our homestead.

Its parents had previously and successfully reared many young ones; but three years ago they hatched only *one* out of four eggs, the which they immediately neglected, by commencing the rebuilding of a nest upon the top of it. Upon this discovery, the unfledged and forsaken bird, all but dead, was taken away and placed in flannel by the fire, when after much attention it was restored and then brought up by hand. Thus treated, and away from all other birds, it became familiarized with those only who fed it; consequently, its first singing notes were of a character totally different to those usual with the Canary.

Constantly being talked to, the bird, when about three months old, astonished its mistress by repeating the endearing terms used in talking to it, such as "*Kissie, Kissie*," with its significant sounds. This went on, and from time to time the little bird repeated other words; and now, for hours together, except during the moulting season, astonishes us by *ringing the changes*, according to its own fancy, and as plain as any human voice can articulate them, on the several words—"Dear sweet Titchie" (its name), "*Kiss Minnie*," "*Kiss me then dear Minnie*," "*Sweet pretty little Titchie*," "*Kissie, kissie, kissie*," "*Dear Titchie*," "*Titchie wee, gee, gee, gee, Titchie, Titchie*."

Now as I have shown that the great Melanchthon signed his name in no less than *sixty* different ways in uniting the words *Philippus Melanchthon* (see the plate of facsimiles in my work, a copy of which is in the British Museum), you will not be surprised at the extraordinary manner in which the dear little bird varies the several words he has learned.

The usual singing notes of the bird are more of the character of the Nightingale, mingled occasionally with the sound of the dog-whistle used about the house. It whistles also, very clearly, the first bar of "*God save the Queen*." It is hardly necessary to add that the bird is, of course, by nature remarkably tame; so much so, that, during its season, it will perch down from its cage on my finger, shouting and talking in the most excited state.

Our friend Mr. Waterhouse Hawkins, who has heard the bird, tells me that about twenty years ago a Canary that spoke a few words was exhibited in Regent Street, the only other instance, I believe, publicly known.

I have now only to apologize for having trespassed upon your

patience to read all this long story about the accomplishments of a Little Bird ; though at the same time I feel, that in acquainting you, as Vice-President of the Zoological Society, with the facts stated, I am not only giving you the means of placing upon record the same, but affording you the opportunity of witnessing the *truth* thereof, as being, in the event of any accident happening to the bird, a more satisfactory evidence than the mere assertion of,

Dear Sir,

Yours most faithfully,

Dr. John Gray.

S. LEIGH SOTHEBY.

April 27, 1858.

Dr. Gray, V.P., in the Chair.

The following papers were read :—

- I. SYNOPSIS OF THE AMERICAN ANT-BIRDS (FORMICARIIDÆ).
By PHILIP LUTLEY SCLATER, M.A., F.L.S., ETC. PART II.
CONTAINING THE FORMICIVORINÆ OR ANT-WRENS.

(Aves, Pl. CXLI., CXLII.)

Subfam. II. FORMICIVORINÆ.

Habitus gracilior, statura minor : rostrum tenuius, magis subulatum, vix uncinatum : tarsi gracilibus ; acrotarsiis interdum, paratarsiis plerumque integris.

I have met with very great difficulty in separating this group into genera presenting good distinguishing characters. Dr. Cabanis has depended mainly upon the division of the tarsal scutes ; but I have found instances of great variation in this respect in apparently very closely allied species, although, I confess, this character ought to be attended to, and has been much too generally overlooked. Then again as to the number of rectrices, it is not only in the long-tailed *Ellipura* (as termed by Cabanis) that they are reduced to ten, but also in some of the short-tailed species (as in *Myrmotherula haurwelli* and *M. pygmæa*) ; and I have been compelled to abandon that sign as a ground for generic difference. On the other hand, Dr. Cabanis seems to me to have attached too little weight to comparative length of the tail, as in placing *Formicivora grisea* and *Myrmotherula pygmæa* in the same genus ; and I have thought it more natural to arrange the long-tailed and short-tailed *Formicivora* in different sections.

Genus I. HERPSILOCHMUS.

Herpsilochmus, Cab. Orn. Not. i. p. 228.

Habitus thamnophilinus sed statura minor : rostrum crassiusculum basi latiore quam in genere Formicivora : tarsi breves ; acrotarsiis et paratarsiis divisis.

This small section (as Dr. Cabanis has observed) seems to form the transition between *Thamnophilus* and *Formicivora*. It is a smaller and weaker form than any of the last subfamily, and more resembles *Formicivora*, except in its stronger and more broadly-based beak.

1. HERPSILOCHMUS FILEATUS.

Myiothera pileata, Licht. Doubl. p. 44 ; Max. Beitr. iii. 1078.

Formicivora pileata, Menetr. Mon. Myioth. p. 485 ; Burm. Syst. Ueb. iii. p. 78.

Thamnophilus pileatus, D'Orb. Voy. Ois. p. 175.

Herpsilochmus pileatus, Cab. Orn. Not. p. 224 ; Bp. Consp. p. 199.

Pallide plumbeus : pileo, alis caudaque nigris, his albo marginatis : superciliis, gutture, et ventre medio albis.

Hab. South-eastern Brazil (*Burm.*) ; Bolivia, Chiquitos (*D'Orb.*).

Mus. Paris., Berolin.

2. HERPSILOCHMUS PECTORALIS.

Herpsilochmus pectoralis, Sclater, P. Z. S. 1857, p. 132.

Cinereus : pileo, alis caudaque nigris, his albo marginatis et rectricum lateralium dimidio apicali albo : superciliis et loris albis : subtus dilutior, ventre medio albo : plaga magna pectorali nigra.

Long. tota 5·0, alæ 2·1, caudæ 1·7.

Hab. S. America ; Brazil.

Mus. Brit., Acad. Phil., et P. L. S.

3. HERPSILOCHMUS RUFIMARGINATUS.

Myiothera rufimarginata, Temm. Pl. Col. 132. fig. 1.

Myiothera variegata, Licht. in Mus. Berol.

Formicivora rufimarginata, Menetr. Mon. Myioth. p. 487 ; Burm. Syst. Ueb. iii. p. 79.

Myiothera scapularis, Max. Beitr. iii. 1088.

Herpsilochmus rufimarginatus, Cab. Orn. Not. i. p. 224 ; Bp. Consp. p. 199.

♂. *Olivaceus : pileo nigro : superciliis albis : alis et cauda nigris albo terminatis ; remigum marginibus externis late rufis : subtus pallide viridi-flavus, gula albescente.*

♀. *Pileo rufo.*

Long. tota 4·0, alæ 2·0, caudæ 1·7.

Hab. S.E. Brazil.

Mus. Brit., Acad. Phil., P. L. S.

Genus II. MYRMOTHERULA.

Cauda brevis; sæpe brevissima: rectricibus plerumque duodecim, interdum decem: rostrum tenue, subulatum, non magis altum quam latum: acrotarsiis et paratarsiis divisis.

In *M. pygmæa* and the next following species of this genus the tail is very diminutive, and the tail-feathers are much narrowed. In the latter part of the series it is longer and more broadly feathered, but never so elongated as in true *Formicivora*. The general facies of these two genera is otherwise nearly the same.

1. MYRMOTHERULA PYGMÆA.

Gobemouche à poitrine orangée de Cayenne, Buff. Pl. Enl. 831. fig. 2.

Muscicapa pygmæa, Gm. S. N. i. p. 933.

Myrmothera minuta, D'Orb. Voy. p. 184?

Formicivora pygmæa, Cab. Orn. Not. p. 227; Bp. Consp. p. 200; Slater, P. Z. S. 1855, p. 147.

♂. *Nigra: superciliis, striis in dorso medio, et tectricum apicibus albis: subtus sulphurea, gula alba: caudæ rectricibus decem.*

♀. *Capite rufo striato: gula fulvida.*

Long. tota 3·2, alæ 1·8, caudæ 0·8.

Hab. Cayenne; New Granada; Bogota; Rio Napo; Bolivia (D'Orb.).

Mus. Brit., P. L. S.

2. MYRMOTHERULA SURINAMENSIS. (Pl. CXLI. fig. 1 ♂.)

Sitta surinamensis, Gm. i. 442 (♀).

Surinam Nuthatch, Lath. G. H. iv. p. 72. pl. 62.

Formicivora quadrivittata, Cab. Orn. Not. p. 227; Bp. Consp. p. 209.

♂. *Nigra, albo striata: alis caudaque nigris albo limbatis et terminatis: subtus alba, pectore nigro striato.*

♀. *Capite rufo, nigro striato: subtus rufo tincta et striis nullis.*

Long. tota 3·5, alæ 1·8, caudæ 1·0.

Hab. Cayenne; Brit. Guiana; Rio Napo.

Mus. Brit., P. L. S.

3. MYRMOTHERULA MULTOSTRIATA, sp. nov. (Pl. CXLI. fig 2 ♂, 3 ♀.)

♂. *Nigra, albo striata: alis caudaque nigris albo limbatis et terminatis: subtus alba, lineis angustis nigris omnino striata.*

♀. *Capite ferrugineo, nigro striato: subtus pallide rufescenti-albida, striis minus crebris nigris.*

Long. tota 3·5, alæ 1·9, caudæ 0·9.

Hab. Upper Amazon, r. Ucayali (Hauzwel).

Mus. Brit., P. L. S.

4. MYRMOTHERULA GUTTATA.

Myrmothera guttata, Vieill. Gal. Ois. p. 251. pl. 155.

Rhopoterpe guttata, Cab. Orn. Not. i. p. 228; Bp. Consp. p. 200.

Myiothera paciloptera, Cuv. in Mus. Par. (♀).

♂. *Cinerea*: interscapularium basi alba: dorso postico et ventre imo rufis: alis caudaque nigris: remigibus extus rufescente marginatis: tectricum alarum omnium, secundariorum dorso proximarum, rectricum et caudæ tectricum apicibus pallido rufo late terminatis.

♀. Olivaceo-brunnea, alis caudaque, prout in mari, guttatis: ventre imo crissoque rufis.

Long. tota 3·2, alæ 2·0, caudæ 0·7.

Hab. Cayenne.

Mus. Brit., P. L. S.

5. MYRMOTHERULA GULARIS.

Thamnophilus gularis, Spix. Av. Bras. ii. p. 30. pl. 41. fig. 2.

Myiothera cinerea, Max. Beitr. iii. p. 1093.

Myrmothera gularis, Menetr. Mon. p. 476. pl. 2. fig. 2.

Rhopoterpe (!) *gularis*, Cab. Orn. Not. i. p. 228; Bp. Consp. p. 200.

Supra brunnea, castaneo tincta: subtus cinerea, gutture nigro albo punctato: alarum tectricibus nigris ochraceo terminatis.

Long. tota 3·8, alæ 2·1, caudæ 1·1, tarsi 0·8.

Hab. S.E. Brazil (Max.).

Mus. Brit., P. L. S.

6. MYRMOTHERULA HÆMATONOTA.

Formicivora hæmatonota, Sclater, P. Z. S. 1857, p. 48.

Supra brunnea, dorso medio rubro, uropygium versus dilutius: alarum tectricibus nigris ochraceo terminatis; secundariorum externarum apicibus eodem colore obsolete terminatis: subtus cinerea, gula triangulariter albo maculata: ventris lateribus et crisso pallide brunneis: cauda unicolore brunnea.

Long. tota 4·0, alæ 2·0, caudæ 1·2.

Hab. Chamicurros, Eastern Peru (Huxwell).

Mus. Brit.

Very like *M. gularis*, but with the back more of a blood-red, and paler below. Perhaps an immature stage of the following species.

7. MYRMOTHERULA ORNATA.

Formicivora ornata, Sclater, Rev. et Mag. de Zool. 1853, p. 480; P. Z. S. 1855, p. 147; List Bog. B. p. 19.

♂. *Cinerea*: dorso late castaneo: subtus paulo dilutius: gula et cervice antica nigerrimis: alarum tectricibus nigris albo terminatis: cauda nigra albo anguste terminata.

♀. *Fusca: dorso castaneo: cauda rufa: subtus pallide brunnea, pectore antico cervino: alis fusco-nigris ochraceo terminatis.*

Long. tota 3·75, alæ 2·0, caudæ 1·5.

Hab. New Granada, Bogota; Rio Napo.

Mus. Brit., Paris., P. L. S.; Gul. Jardine, Bart., Dom. Eyton.

8. MYRMOTHERULA HAUXWELLI.

Formicivora hauxwelli, Sclater, P. Z. S. 1857, p. 131. pl. 126. fig. 2 (♂).

♂. *Plumbea, subtus paulo dilutior, mento albescentiore: alis nigris, tectricibus omnibus albo terminatis, duas lineas albas formantibus; secundariis dorso proximis extus, caudæ quoque tectricibus et rectricibus ipsis omnibus macula terminali alba præditis: uropygii plumis laxis, elongatis: cauda brevissima, rectricibus solum decem.*

♀. *Fusco-olivacea, subtus rufa: alarum tectricibus et secundariis caudaque nigris rufo late terminatis.*

Long. tota 3·7, alæ 2·1, caudæ 0·9.

Hab. Eastern Peru, Chamicurros (*Hauxwell*); Ecuador, Rio Napo.

Mus. Brit., P. L. S.

9. MYRMOTHERULA ERYTHRONOTA.

Formicivora erythronota, Hartl. R. Z. 1853, p. 4; Burm. Syst. Ueb. iii. p. 75.

♂. *Nigerrima, dorso toto castaneo; hypochondriis plumosis et tectricibus subalaribus cum tectricum superiorum marginibus albis.*

♀. *Olivaceo-brunnea, subtus medialiter ochraceo-rufescens: dorso castaneo.*

Long. tota 4·5, alæ 2·0, caudæ 1·7.

Hab. S.E. Brazil, prov. Rio.

Mus. Brit., P. L. S.

10. MYRMOTHERULA AXILLARIS.

Le grisin de Cayenne, femelle, Buff. Pl. Enl. 643. fig. 2?

Myrmothera axillaris, Vieill. Dict. xvii. p. 321; Enc. Méth. p. 682; D'Orb. Voy. p. 183.

Myiothera fuliginosa, Licht. Doubl. p. 45; Max. Beitr. iii. 1067?

Myrmothera axillaris, Men. Mon. Myioth. p. 478.

Formicivora axillaris, Cab. Orn. Not. p. 226; Bp. Consp. p. 200; Burm. Syst. Ueb. iii. 76.

♂. *Nigricanti-schistacea, corpore subtus medialiter nigerrimo, hypochondriis valde plumosis; tectricibus alarum inferioribus et plumis axillaribus albis: alis caudaque nigris albo terminatis.*

♀. *Viridescenti-cinerea, subtus dilute ochracea, gula dilutiore, lateribus cinerascens.*

Long. tota 4·0, alæ 2·0, caudæ 1·5.

Hab. Trinidad; Cayenne; Brit. Guiana; Upper Amazon; Cha-

micurros (*Hauzwell*) ; Eastern Peru ; Interior of Bolivia (*D'Orb.*) ; Brazil, Rio Janeiro (*Burm.*).

Mus. Brit., P. L. S.

This species seems to be widely distributed. I have examples from Trinidad, British Guiana, Brazil, the Upper Amazon, and the Rio Napo, which I refer to it. It may be distinguished from all its near allies, except the next following, by the thickly-feathered white flanks. The specimens from Guiana and Cayenne are blacker on the under surface than the Brazilian bird.

11. MYRMOTHERULA MELÆNA.

Formicivora melæna, Sclater, P. Z. S. 1857, p. 130.

♂. *Fuliginoso-nigra, subtus intensior ; hypochondriis valde plumosis cum tectricibus subalaribus albis : alarum tectricibus et caudæ rectricibus albo terminatis.*

Long. tota 4·0, alæ 2·1, caudæ 2·5.

Hab. New Granada, Bogota.

Mus. P. L. S.

Distinguishable from the preceding species by its black, not slate-coloured, upper surface.

12. MYRMOTHERULA MENETRIESI.

Myrmothera menetriesi, D'Orb. Voy. p. 184.

Formicivora menetriesi, Cab. Orn. Not. p. 226 ; Bp. Consp. p. 200.

♂. *Nigricanti-schistacea, gutture et pectore toto nigris, ventre schistaceo : alis caudaque nigris albo terminatis.*

Hab. Bolivia (*D'Orb.*) ; Eastern Peru, Chamicurros (*Hauzwell*) ; Rio Napo.

Mus. Brit., P. L. S.

I refer to this species of D'Orbigny, not without doubt, a bird from the Upper Amazon and Rio Napo, which differs from *M. axillaris* in the want of the white flanks, and in the termination of the black colouring below at the lower part of the breast.

13. MYRMOTHERULA BREVICAUDA.

Formicivora brevicauda, Sw. Zool. Journ. ii. p. 148 ; Sclater, P. Z. S. 1857, p. 131.

♂. *Cinerea unicolor, plaga ovali in gutture et collo antico nigra : alis nigricantibus extus cinereo limbatis, harum autem tectricibus nigris albo terminatis : cauda brevi, colore nigro-cinerea, rectricum macula subapicali nigra, ipsarum autem apicibus albidis.*

♀. *Olivascenti-brunnea, subtus clarius, capite subcinereo, gutture albicantiore : tectricum alarum apicibus colore dilutioribus.*

Long. tota 3·5, alæ 1·9, caudæ 1·2.

Hab. South-eastern Brazil, Rio.

Mus. Brit., P. L. S.

Easily distinguishable by its dark uniform cinereous plumage and the oval patch of black on the fore-neck and throat.

14. MYRMOTHERULA UROSTICTA.

Formicivora urosticta, Sclater, P. Z. S. 1857, p. 130. pl. 126. fig. 1.

Cinerea subtus dilutior : plaga gulari elongata nigra : alis nigricanti-cinereis, extus cinereo strictissime limbatis, tectricibus autem nigris, albo terminatis : cauda nigra, rectricibus omnibus albo late terminatis ; rectricis unæ utrinque extimæ tertia fere parte apicali alba, hoc colore apud alias rectrices gradatim decrescente.

Long. tota 3·5, alæ 2·0, caudæ 1·2.

Hab. Brazil.

Mus. Brit., P. L. S.

The broad white terminations of the outer tail-feathers render this bird easily recognizable amongst its affines.

Genus III. FORMICIVORA.

Formicivora, Swains. Zool. Journ. ii. p. 145 (1825).

Ellipura, Cab. Orn. Not. i. p. 228 (1847).

Rostrum tenue, subulatum, non magis altum quam latum : cauda elongata ; rectricibus valde graduatis, duodecim aut decem : acrotarsiis et paratarsiis plerumque divisis.

1. FORMICIVORA GRISEA.

Le grisin de Cayenne, Buff. Pl. Enl. 643. fig. 1.

Turdus griseus, Bodd. Tabl. d. Pl. Enl.

Motacilla grisea, Gm. S. N. i. p. 964.

Thamnophilus griseus ♂, Spix, Av. Bras. ii. p. 29. pl. 41. fig. 1.

Formicivora nigricollis, Sw. Zool. Journ. ii. p. 147 ; Menetr. Mon. Myioth. p. 482 (♂).

"Myiothera leucophrys, Licht." Max. Beitr. iii. 1075.

Formicivora deluzæ, Menetr. Mon. Myioth. pl. 5. fig. 2. p. 484 (♀).

Formicivora grisea, Cab. Orn. Not. i. p. 225 ; Bp. Consp. p. 199.

Ellipura grisea, Burm. Syst. Ueb. iii. p. 67.

♂. *Obscure chocolantino-brunnea, alis caudaque nigris, alarum tectricibus et caudæ rectricibus albo terminatis : superciliis angustis albis : subtus nigra, lateribus albo mixtis.*

♀. *Supra mari similis, subtus saturate fulva.*

Long. tota 4·5, alæ 2·2, caudæ 1·8.

Hab. Cayenne ; Brit. Guiana ; Para (*Spix*) ; South-eastern Brazil (*Max*).

Mus. Brit., P. L. S.

2. FORMICIVORA INTERMEDIA.

Myiothera leucophrys, Licht. in Mus. Berol.

Formicivora intermedia, Cab. Orn. Not. p. 225.

Formicivora leucophrys, Bp. Consp. p. 200.

♂. *Similis præcedenti, sed superciliis latioribus et tectricum alarum marginibus albis latioribus.*

♀. *Subtus pure alba* (teste Cab.).

Hab. Trinidad; Venezuela, Cartagena et Aragua (Mus. Berol.); New Granada, Bogota.

Mus. Brit., P. L. S.

3. FORMICIVORA RUFATRA.

Thamnophilus griseus ♀, Spix, Av. Bras. ii. pl. 40. fig. 1.

"*Myiothera superciliaris*, Licht." Max. Beitr. iii. 1073.

Thamnophilus rufater, Lafr. et D'Orb. Syn. Av. in Mag. de Zool. 1837, p. 12; D'Orb. Voy. p. 180.

Formicivora rufatra, Cab. Orn. Not. i. p. 225; Bp. Consp. p. 199.

♂. *Supra brunneo-rufa: superciliis et tectricum alarum caudæque rectricum terminationibus albis: subtus gutture toto et pectore medio nigris, hujus lateribus cum ventre imo albis, hypochondriis fulvis.*

♀. *Subtus alba, fulvo tincta* (teste Cab.).

Long. tota 5·0, alæ 2·0, caudæ 2·3.

Hab. South-eastern Brasil (Max); Bolivia (D.Orb.).

Mus. Brit., P. L. S.

4. FORMICIVORA FERRUGINEA.

Myiothera ferruginea, Licht. Doubl. p. 44; Temm. Pl. Col. 132. fig. 3.

Formicivora ferruginea, Menetr. Mon. Myioth. p. 488.

Drymophila variegata, Such, Zool. Journ. i. p. 559.

Ellipura ferruginea, Cab. Orn. Not. i. p. 238; Bp. Consp. p. 200; Burm. Syst. Ueb. iii. p. 71.

♂. *Saturate ferruginea: pileo, interscapulio, alis et cauda nigris: superciliis, regione auriculari, maculis tectricum alarum et caudæ, marginibus secundariarum et rectricum apicibus albis: interscapulio albo mixto.*

♀. *Mari similis sed magis rufescens et subtus valde dilutior.*

Long. tota 5·2, alæ 2·2, caudæ 2·4.

Hab. South-eastern Brazil.

5. FORMICIVORA GENÆI.

Formicivora genæi, De Filippi, Cat. Mus. Mediol. p. 31.

♂. *Pileo nigro, superciliis elongatis et maculis quibusdam in fronte et pileo medio albis; cervice postica grisea nigro varia; interscapulii macula celata alba: dorso postico ferrugineo: alis caudæque nigris, tectricum alarum marginibus et caudæ rectricum apicibus latis albis: subtus a mento ad medium ventrem alba, regulariter nigro striata: ventre crissoque ferrugineis: rostri mandibula superiore nigricante, inferiore cum pedibus albidis.*

♀. *Supra rufescens, capite fulvo striato: subtus sordide alba,*

pectore nigro striato : dorso postico et ventre imo dilutius ferrugineis, cauda nigricanti-brunnea, albido terminata.

Long. tota 5·2, alæ 2·2, caudæ 2·4.

Hab. South-eastern Brazil.

Mus. Mediol., P. L. S.

The upper surface of this bird is like that of *F. ferruginea*, the lower like that of *F. rufa*. M. De Filippi does not mention the white ends of the rectrices, but his specimen was probably immature.

6. FORMICIVORA ERYTHROCERCA, sp. nov. (Pl. CXLII.)

♂. *Pileo nigro, loris et superciliis elongatis albis : dorso superiore griseo nigro variegato : interscapulii plumis ad basin albis : dorso postico ferrugineo : alis extus cauda et tota saturate rufis : alarum tectricibus superioribus nigris albo terminatis : subtus griseiscenti-alba, nigro variegata, ventre cum lateribus et crisso ferrugineis ; rostro brunnescente, pedibus pallidis.*

Long. tota 5·5, alæ 2·3, caudæ 2·7.

Hab. Brazil?

Mus. Dom. Eyton.

A single specimen of this apparently distinct species has been kindly lent to me by Mr. Eyton. The colouring of the upper surface resembles *F. ferruginea* and *F. genæi*, but it is easily distinguishable by its pure rufous tail.

7. FORMICIVORA CAUDATA.

Formicivora caudata, Sclater, P. Z. S. 1854, p. 254. pl. 74., et 1855, p. 147.

♂. *Supra nigra albo striata, pileo postico nigro : dorso postico ferrugineo : alis nigris, tectricibus albo, remigibus rufo marginatis : subtus alba, nigro striata, ventre imo ferrugineo : cauda longissima, rectricum omnium apicibus albis.*

♀. *Striis corporis superi rufescentibus : alis rufescente marginatis : subtus sordide alba, pectore solum striato : dorso et ventre imo dilutioribus.*

Long. tota 5·8, alæ 2·1, caudæ 3·1.

Hab. New Granada.

Mus. Brit., P. L. S.

8. FORMICIVORA RUFÆ.

Myiothera rufa, Max, Beitr. iii. p. 1095.

Formicivora rufa, Menetr. Mon. Myioth. p. 497. pl. 9. fig. 1.

Ellipura rufa, Cab. Orn. Not. i. p. 229; Bp. Conspectus p. 201; Burm. Syst. Ueb. iii. p. 70.

♂. *Brunnescenti-rufa : tectricibus alarum et cauda nigris, albo terminatis : subtus alba, regulariter nigro striata ; ventre medio albo, hypochondriis pallide rufescentibus.*

♀. *Obscurior, flavescentior, striis corporis inferi rufescentibus*
(teste Burmeister).

Long. tota 5·0, alæ 2·2, caudæ 2·2.

Hab. South-eastern Brazil.

9. FORMICIVORA MALURA.

Myiothera malura, Temm. Pl. Col. 353. figs. 1, 2.

Formicivora malura, Ménétr. Mon. p. 496.

Ellipura malura, Cab. Orn. Not. i. p. 228 ; Bp. Consp. p. 200 ;
Burm. Syst. Ueb. p. 68.

♂. *Plumbea, uropygio schistaceo : cervice et pectore antico*
nigro striatis : alarum tectricibus albo marginatis.

♀. *Brunnescenti-grisea : cervice et pectore antico nigricante*
striatis : alarum tectricum apicibus sordide flavidis.

Hab. South-eastern Brazil ; S. Paolo, Ypanema (Natterer).

Mus. Brit.

This is a scarce species. The single example in the British Museum has affixed to it the tail of some other bird, and I am unable to give its dimensions.

10. FORMICIVORA SQUAMATA.

Myiothera squamata, Licht. Doubl. p. 44 ; Max, Beitr. iii. p. 1070.

Formicivora maculata, Sw. Zool. Journ. ii. p. 147 ; Ménétr. Mon.
p. 494. pl. 5. fig. 1 (♂).

Ellipura squamata, Cab. Orn. Not. i. p. 229 ; Bp. Consp. p. 201 ;
Burm. Syst. Ueb. iii. p. 70.

♂. *Supra nigra, superciliis albis, dorso albo guttulado : alis*
caudaque nigris, guttis albis transfasciatis : subtus cinerea,
nigro squamata, ventre medio albicante.

♀. *Guttis et fasciis corporis superi pallide rufis ; subtus dilutior,*
hypochondriis rufescentibus.

Long. tota 5·1, alæ 2·1, caudæ 2·1.

Hab. South-eastern Brazil.

Mus. Brit., P. L. S.

11. FORMICIVORA QUIXENSIS*.

Thamnophilus quixensis, Corn. Syn. Vert. p. 12 (♂).

Thamnophilus rufiventris, Corn. ibid. (♀).

Pyriglena quixensis, Selater, P. Z. S. 1854, p. 112 ; et 1858, p. 67.

Pyriglena rufiventris, Selater, ibid. (♀).

♂. *Nigerrima, dorsi postici totius plumarum basibus, maculis tec-*
tricum minorum parvis rotundis et tectricum majorum et caudæ
rectricum apicibus cum tectricibus subalaribus albis.

* Nearly allied to *F. quixensis* is *Formicivora boucardi*, mihi, ex Mexico, Oaxaca. Vide infra P.Z.S. June 8th, 1858.

♀. *Mari similis sed abdomine saturate castaneo.*

Long. tota 4·5, alæ 2·1, caudæ 2·0.

Hab. Ecuador, Rio Napo.

Mus. Brit., P. L. S.

After some hesitation, I have united these birds as ♂ and ♀, there being no difference in structure of specimens which I have recently acquired for my own collection.

12. FORMICIVORA STRIGILATA.

Myiothera strigilata, Max, Beitr. iii. p. 1064.

Formicivora strigilata, Ménétr. Mon. Myioth. p. 493.

Supra castanea dorso summo et capitis lateribus longitudinaliter nigro striatis : alarum tectricibus albo, secundariis fulvo late terminatis : subtus cinnamomescenti-alba, pectore et lateribus nigro guttatis : cauda nigra, rectricibus duabus mediis dorso concoloribus, ceteris albo terminatis et una utrinque extima item albo extus marginata.

Long. tota 6·0, alæ 2·6, caudæ 2·5.

Hab. South-eastern Brazil.

Mus. Acad. Phil., et Lugdunense.

A very peculiar species, of which I have only seen two examples in the Museums above named. I am quite doubtful about its true situation.

13. FORMICIVORA MACULATA.

Myiothera maculata, Max, Beitr. iii. p. 1088.

Leptorhynchus striolatus, Ménétr. Mon. p. 517. pl. 10. fig. 2.

Ellipura maculata, Cab. Orn. Not. i. p. 229 ; Bp. Consp. p. 201.

Ramphocæmus maculatus, Burm. Syst. Ueb. iii. p. 73.

Pileo, alis extus et pectore albis nigro variegatis : gula alba : dorso medio castaneo : abdomine flavo : tarsis obsolete squamatis.

Long. tota 4·0, alæ 1·8, caudæ 1·8, rostri a rictu 0·55, tarsi 0·6.

Hab. South-eastern Brazil ; environs of Rio (*Ménétriés*).

Mus. Brit., P. L. S.

14. FORMICIVORA CALLINOTA.

Formicivora callinota, Selater, P. Z. S. 1855, p. 89. pl. 96. et p. 147 ; List of Bog. B. p. 19.

Olivaceæ, pileo nuchæque nigris : loris, capitis lateribus cum gula et pectore cinereis : abdomine pallide flavicanti-viridi : tergo late castaneo, nigro partim marginato : alis nigris, carpo et tectricum marginibus flavis : secundariis et rectricibus olivaceo marginatis.

Long. tota 4·0, alæ 2·0, caudæ 1·7.

Hab. New Granada, Bogota.

Mus. Brit.

Genus IV. PSILORHAMPHUS.

Leptorhynchus, Mén. Mon. Myioth. p. 515.

Psilorhamphus, Sclater, P. Z. S. 1855, p. 90.

Rostrum rectum, tenue, elongatum, ut in genere sequente, sed brevius; narium membrana obtectorum apertura basali, laterali, elongata: alæ breves rotundatæ, remige quinta sexta et septima longissimis: caudæ longæ rectricibus decem graduatis: tarsi longi, graciles, læves, acrotarsiis et paratarsiis integris: sexus similes.

I am not confident of this being the right position for the present and the next following genus. Their members are very peculiar birds, in the formation of the nostrils quite different from the rest of the family, and might perhaps be more naturally placed as a distinct subfamily of *Pteroptochidæ*. Here, and again in the genus *Heterocnemis*, there is little external difference between the appearance of these birds and the true Wrens.

1. PSILORHAMPHUS GUTTATUS.

Leptorhynchus guttatus, Mén. Mon. Myioth. p. 516. pl. 10. fig. 1.

Ramphocœnus guttatus, Burm. Syst. Ueb. iii. p. 73.

Psilorhamphus guttatus, Sclater, P. Z. S. 1855, p. 90.

Supra cinereus, uropygio et alis extus rufescentibus: dorso, rectricibus et secundariis alarum, et cauda punctis minutis albis irroratis: subtus dilutior, ventre medio albescentiore et nigro punctato: hypochondriis et crisso rufescentioribus et nigro transversim lineatis: cauda albo terminata: rostro superiore nigro, inferiore cum pedibus flavis.

Long. tota 5·3, alæ 2·0, caudæ 2·3, rostri a rectu 0·8, tarsi 1·0.

Hab. Cuyaba, Brazil (*Langsdorf*).

Mus. P. L. S.

I have never met with but one example of this curious bird, which is now in my own collection.

Genus V. RHAMPHOCÆNUS.

Ramphocœnus, Vieill. Nouv. Dict. xxix. p. 6 (1818).

Acontistes, Sund. Kongl. Vet. Acad. Handl. 1835, p. 95.

Scolopacinus, Bp. P. Z. S. 1837, p. 118.

Rostrum rectum, tenue, longius quam caput, ad basin latum, apicem versus compressum; narium apertura basali, laterali, longa, membrana partim obtecta: acrotarsiis obsolete divisis, paratarsiis integris: cauda longa, valde graduata; rectricibus solum decem.

1. RHAMPHOCÆNUS MELANURUS.

Ramphocœnus melanurus, Vieill. N. Dict. xxix. p. 6; Enc. Méth. p. 863; Gal. Ois. ii. pl. 128; Burm. Syst. Ueb. p. 72.

Myiothera longirostris, Licht. in Mus. Berol.

Troglodytes rectirostris, Sw. Zool. Ill. pl. 140.

Troglodytes gladiator, Max, Beitr. iii. p. 752.

Murino-brunneus; *subtus albus, lateraliter paulum rufescens*:
cauda nigra, rectrice una utrinque extima sordide brunnea.

Long. tota 4·75, alæ 1·9, caudæ 1·7, rostri a rictu 9·5, tarsi 0·8.

Hab. S.E. Brazil (*Max.*); Para (*Wallace*).

Mus. Brit., P. L. S.

2. RHAMPHOCÆNUS CINEREIVENTRIS.

Rhamphocænus cinereiventris, Sclater, P. Z. S. 1855, p. 76, pl. 87.

Olivaceo-brunneus; *capitis lateribus rufis, spatio postoculari nigro: gutture albo, nigro-cinerascente striato: abdomine cinerascente, medialiter albescentiore, lateraliter autem olivascentiore: cauda nigricanti-fusca.*

Long. tota 4·0, alæ 2·0, caudæ 1·3.

Hab. New Granada, Pasto (*Delattre*).

Mus. Derbium.

3. RHAMPHOCÆNUS RUFIVENTRIS.

Scelopacinus rufiventris, Bp. P. Z. S. 1837, p. 119; Gray, Gen. B. i. p. 357. pl. 47. fig. 2.

Murino-brunneus: *capite toto præcipue ad latera rufescente: subtus pallide rufescens: gutture albo, plumis subtus cinereis: cauda nigra, rectricibus tribus extimis albo terminatis, extima etiam in pogonio externo albo limbata.*

Long. tota 5·3, alæ 2·2, caudæ 2·0, rostri a rictu 1·1, tarsi 0·9.

Hab. Guatemala, Coban (*Delattre*); New Granada, S. Martha (*Verreaux*).

Mus. Brit., Derb., P. L. S.

Genus VI. CERCOMACRA.

Statura major: ptilosis magis unicolor: forma validior: rostrum ad basin dilatatum: cauda longa e rectricibus plerumque decem multum graduatis: acrotarsiis divisis, paratarsiis integris.

These birds form a transition between *Formicivora* and *Pyriglena*. I have sometimes been inclined to unite them to the latter; but they differ in their broad flattened bill, which in *Pyriglena* is compressed throughout.

1. CERCOMACRA CÆRULESCENS.

Myrmothera cærulescens, Vieill. Nouv. Dict. xvii. p. 311; Enc. Méth. p. 680.

Formicivora cærulescens, Ménétr. Mon. Myioth. p. 499. pl. 6. figs. 1, 2.

Ellipura cærulescens, Cab. Orn. Not. 1. p. 229; Bp. Consp. p. 201; Burm. Syst. Ueb. iii. p. 67.

♂. *Clare cinerea: interscapulii macula celata, campterio, tectricum apicibus et caudæ apice albis.*

♀. *Flavicanti-fusca, subtus rufescens.*

Long. tota 6·0, alæ 2·3, caudæ 3·0.

Hab. South-eastern Brazil, prov. of Rio (*Ménétries*).

Mus. Brit., P. L. S.

2. CERCOMACRA CINERASCENS.

Formicivora cærulescens, Sclater, P. Z. S. 1854, p. 112.

Formicivora cinerascens, Sclater, P. Z. S. 1859, p. 131.

♂. *Cinerea*; *campterio concolore: interscapulii macula celata et tectricum apicibus (ætate evanescentibus!) albis: caudæ apice latiore alba.*

Long. tota 5·7, alæ 2·5, caudæ 2·6.

Hab. Eastern Peru, r. Ucayali (*Hauxwell*); Ecuador, Rio Napo.

Mus. Brit.

3. CERCOMACRA TYRANNINA.

Pyriglena tyrannina, Sclater, P. Z. S. 1855, p. 90. pl. 98. et p. 147; List of Bog. B. p. 19.

♂. *Nigricanti-cinerea, subtus dilutior: interscapulii macula celata, campterio, alarum tectricum marginibus et caudæ apice angusta albis.*

♀. *Pallide brunnea, rufescente tincta: abdomine toto clare rufo.*

Long. 5·2, alæ 2·5, caudæ 2·25.

Hab. New Granada, Bogota.

Mus. Brit., P. L. S.

4. CERCOMACRA NIGRICANS, sp. nov.

Formicivora melanaria, Ménétr. Mon. Myioth. p. 500. pl. 9. fig. 2??

♂. *Cinerascenti-nigra, subtus nigra; macula interscapulii celata, tectricum alarum marginibus, remigum basi interiore et caudæ rectricum omnium apicibus albis: rostri nigri mandibula inferiore albicante: pedibus nigris.*

Long. tota 5·5, alæ 2·4, caudæ 2·5.

Hab. New Granada, S. Martha (*Verreaux*); Bogota.

Mus. Brit., P. L. S.

I received specimens of this bird from M. Verreaux, labeled "*F. melanaria*." But that species seems to be "coal black" above, and is from a very different zoological region. I therefore doubt their identity.

5. CERCOMACRA ATROTHORAX.

L'Alapi de Cayenne, Buff. Pl. Enl. 701. fig. 2.

Turdus atrothorax, Bodd. Table d. Pl. Enl.

Turdus alapi, Gm. et auct.

Formicivora alapi, d'Orb. Voy. p. 181; Mén. Mon. Myioth. p. 502.

Formicivora melanura, Mén. Mon. Myioth. p. 508; pl. 8. figs. 1, 2??

Olivaceo-brunnea, alis fusco-nigris, tectricum apicibus albo punctatis: gutture et pectore toto cum cauda nigris: abdomine et lateribus capitis cinereis.

Long. tota 5·3, alæ 2·2, caudæ 2·2.

Hab. Cayenne; Bolivia (*D'Orb.*).

Mus. Lugdunense et Acad. Philadelph.

Ménétries' *F. melanura* seems to agree very well with this species, and is perhaps not different.

Genus VII. PYRIGLENA.

Pyriglena, Cab. Orn. Not. i. p. 211 (1847).

Rostrum tenue, elongatum, compressum, apice incurva: pedes validi, acrotarsis divisis, paratarsis integris: cauda modice longa, alas subæquans, multum rotundata e remigibus duodecim: statura modica: ptilosis marium nigerrima, fœminarum olivacea aut brunnea.

1. PYRIGLENA LEUCOPTERA.

Turdus leucopterus, Vieill. Nouv. Diet. xx. p. 272; Enc. Méth. p. 666.

Lanius notodelos, Cuv. in Mus. Paris.

Lanius domicella, Licht. Doubl. p. 47.

Drymophila trifasciata, Sw. Zool. Journ. ii. p. 152; Zool. Ill. 1 ser. pl. 27.

Myiothera domicella, Max, Beitr. iii. p. 1058.

Formicivora domicella, Mén. Mon. Myioth. pl. 7. figs. 1, 2.

Pyriglena domicella, Cab. Orn. Not. p. 212; Bp. Consp. p. 202; Burm. Syst. Ueb. iii. p. 59.

Myrmeciza melanura, Strickl. Ann. N. H. 1844, p. 417 (♀).

♂. *Atra: campterio, fascia alarum duplici et macula dorsi celata albis.*

♀. *Olivascenti-brunnea, subtus dilutior, gutture albicante.*

Long. tota 7·0, alæ 3·2, caudæ 3·0.

Hab. South-eastern Brazil.

Mus. Brit., P. L. S.

2. PYRIGLENA ATRA.

Thamnophilus leuconotus, Spix, Av. Bras. ii. p. 27. pl. 39. fig. 2 (1824).

Drymophila atra, Sw. Zool. Journ. ii. p. 153 (1825).

Formicivora atra, Mén. Mon. Myioth. p. 505.

Formicivora maura, Ib. p. 506?

Pyriglena atra, Cab. Orn. Not. p. 212; Bp. Consp. p. 202.

Pyriglena atra, Burm. Syst. Ueb. iii. p. 60.

♂. *Atra: macula magna dorsi celata alba.*

Long. tota 7·0, alæ 3·2, caudæ 3·0.

Hab. Brazil, Para (Spix); Bahia (Burm.).

3. PYRIGLENA ELLISIANA.

Pyriglena ellisiana, Sclater, P. Z. S. 1855, p. 109, pl. 100 (♀).

♂. *Nigra unicolor, alis extus brunnescente tinctis, campterio albo.*

♀. *Fusco-castanea, facie, mento et regione auriculari cum cauda nigricantibus: rostri nigri, mandibulæ inferioris basi alba.*

Long. tota 7·75, alæ 3·0, caudæ 3·5.

Hab. Interior of New Granada, Bogota.

Mus. Brit.

The specimen of this bird which I originally described was a female. During a recent re-examination of the fine series of these birds in the British Museum, I detected the male, which is black, like its congeners, with the bend of the wing white, but wanting the white spot at the base of the interscapularies.

4. PYRIGLENA SERVA.

Pyriglena serva, Sclater, P. Z. S. 1858, p. 66.

♂. *Atra : campterio et tectricum alarium marginibus cum macula dorsi celata albis.*

♀. *Olivascenti-cinerea, subtus ferruginea.*

Long. tota 5·5, alæ 2·6, caudæ 2·3.

Hab. Rio Napo.

Mus. Jard., P. L. S.

5. PYRIGLENA MACULICAUDIS, sp. nov.

♂. *Atra : campterio, tectricum alarium apicibus, macula dorsi celata et caudæ rectricum apicibus albis : rostro et pedibus nigris.*

Long. tota 5·5, alæ 2·7, caudæ 2·5.

Hab. Trinidad.

Mus. P. L. S.

I have two specimens of this apparently unnamed *Pyriglena* in my own collection. It is distinguishable from the three preceding by the white terminations of the tail-feathers. The bill is rather broader and stouter than in the typical species.

Genus VIII. HETEROCNEMIS.

Holocnemis, Strickl. Ann. N. H. xiii. p. 415 (1844).

Heterocnemis, Sclater, P. Z. S. 1855, p. 146.

Rostrum cylindricum, elongatum, graciliusculum, dente apicali fere obsoleto : cauda brevis : tarsi elongati, glabri, scutellis vix apparentibus.

Upon re-examination of *Turdus bambla* (" *Le bambla de Cayenne*," Buffon) and its allied species, which I have hitherto referred to this genus, I have found a more natural position for them among the *Pteroptochidæ*, with which they agree in the formation of the nostrils.

1. HETEROCNEMIS NÆVIA.

Wall-creeper of Surinam, Edwards, Birds, pl. 346 (♂).

Sitta nævia, Gm. S. N. i. p. 442.

Fourmillier tacheté de Cayenne, Buff. Pl. Enl. 823. fig. 1 (♀).

Turdus lineatus, Gm. S. N. i. 828.

Myioturdus lineatus, Ménétr. Mon. p. 471.

Formicarius lineatus, Gray, Gen. i. p. 211.

Holocnemis flammatus, Strickl. Ann. N. H. xiii. p. 415. pl. 13 (♀).

Holocnemis nævia, Strickl. Contr. Orn. 1849, p. 34. pl. 18. figs. 1 (♂), 2 (♀).

Holocnemis lineata, Cab. Orn. Not. i. p. 214 ; Bp. Consp. p. 202.

♂. *Supra schistacea, alis caudaque nigricantibus, alarum tectricibus et caudæ rectricibus externis albo terminatis: subtus pallide schistacescenti-alba, plumis nigricanti-schistaceo marginatis.*

♀. *Olivaceo-brunnea, subtus albida, prout in mari, brunneo variegata.*

Long. tota 6·0, alæ 2·6, caudæ 2, tarsi ·95, rostri a rictu 1·05.

Mus. Berol., P. L. S.

Genus IX. MYRMECIZA.

Drymophila, Sw. Zool. Journ. ii. p. 146 (1825), nec Temm.

Myrmeciza, G. R. Gray, List Gen. 1841, p. 34.

Myrmonax, Cab. Orn. Not. p. 210 (1847).

Rostrum rectum, plus minusve elongatum: alæ breves; remigibus quarta quinta et sexta æqualibus et longissimis: cauda e rectricibus duodecim, valde graduatis: tarsi graciles: acrotarsiis et paratarsiis integris, acrotarsiis interdum obsolete divisis.

1. MYRMECIZA LORICATA.

Myiothera loricata, Licht. Doubl. p. 44 (1823).

Drymophila leucopus, Sw. Zool. Journ. ii. p. 150 (1825).

Formicivora loricata, Mén. Mon. Myioth. p. 490. pl. 4. fig. 1 ♂,

2 ♀.

Myrmonax loricatus, Cab. Orn. Not. p. 210; Burm. Syst. Ueb. ii. p. 64.

Drymophila loricata, Bp. Consp. p. 201.

♂. *Rubiginoso-brunnea; superciliis elongatis et tectricum alarum apicibus pallide ochraceis: subtus alba, facie, gula et plumarum pectoris parte interna nigris; lateribus et crisso ochraceis: rostro nigro: pedibus pallide flavis.*

♀. *Gula et pectore ochraceis nec nigris: rostro inferiore flavo.*

Long. tota 6·0, alæ 2·4, caudæ 2·7, tarsi 1·0.

Hab. South-eastern Brazil, Bahia (Sw.); Rio de Janeiro (Ménét.).

Mus. Brit., P. L. S.

2. MYRMECIZA RUFICAUDA.

Myrmeciza ruficauda, Max, Beitr. iii. p. 1061.

♂. *Capite, collo toto, dorso superiore et corpore infra ad imum pectus nigris; dorsi et pectoris plumis anguste albo marginatis: dorso postico, ventre, crisso, alis et cauda rubiginoso-brunneis; alarum tectricibus nigris ochraceo terminatis: rostro nigro: pedibus flavis.*

♀. *Coloribus dilutioribus: pectoris plumis medialiter nigris, flavicanti-albido marginatis.*

Long. tota 6·0, alæ 2·7, caudæ 2·3, tarsi 0·85.

Hab. South-eastern Brazil (Max).

Mus. Brit., P. L. S.

This bird has been generally confounded with the last species,

from which it may easily be distinguished by the want of the superciliary marks, blacker head, shorter tail and shorter tarsi.

3. MYRMECIZA HEMIMELÆNA.

Thamnophilus guttatus, Lafr. et D'Orb. Syn. 1837, p. 13 ; D'Orb. Voy. p. 177 (nec Vieill.).

Formicivora hemimelæna, Sclater, P. Z. S. 1857, p. 48.

♂. *Castanea, dorsi medii plumis ad basin albis, inde nigris, ad apicem castaneis : capite toto undique et corpore subtus ad medium pectus nigris : ventre medio albido : campterio summo et maculis tetricum alarum apicalibus albis : cauda rufo-castanea unicolore.*

♀. *Obscure olivacea rufo tincta ; interscapulii plumis ad basin albis : dorso postico alis et cauda rufis : alarum tectricibus nigris, sicut in mari, albo guttulatis : subtus læte ferruginea, pectore et ventre medio pallidioribus : lateribus et crisso rufescenti-olivaceis.*

Long. tota 5·0, alæ 2·4, caudæ 1·7.

Hab. Bolivia (D'Orb., Bridges).

Mus. Brit., Paris.

4. MYRMECIZA CINNAMOMEA.

Merle à cravatte de Cayenne, Buff. Pl. Enl. 560. fig. 2.

Turdus cinnamomeus, Gm. S. N. i. p. 825.

Thamnophilus cinnamomeus, Vieill. Enc. Méth. p. 743.

Thamnophilus albicollis, Vieill. ibid. p. 744 (♀).

Holocnemis cinnamomea, Strickl. Ann. N. H. xiii. p. 415 (1844).

Myrmonax cinnamomeus, Cab. Orn. Not. p. 210 ; Schomb. Guian. iii. p. 684 ; Burm. Syst. Ueb. iii. p. 65.

Drymophila cinnamomea, Bp. Consp. p. 201.

Formicivora cinnamomea, Gray, Gen. p. 212.

♂. *Cinnamomeo-brunnea gutture et pectore antico nigris, ventre grisescenti-albo nigro variegato : alarum tectricibus nigris ochraceo terminatis : periophthalmio nudo.*

♀. *Mari similis sed gutture albo : pectoris vitta lata nigra.*

Long. tota 5·7, alæ 2·7, caudæ 2·1.

Hab. Cayenne (Buff.) ; Brit. Guiana (Schomb.).

Mus. Brit., P. L. S.

5. MYRMECIZA LONGIPES.

Myrmothera longipes, Vieill. Nouv. Dict. xii. p. 113 ; Enc. Méth. p. 682 ; Ménét. Mon. Myioth. p. 474.

Drymophila longipes, Sw. Zool. Journ. ii. p. 152 ; Zool. Ill. ser. 2. pl. 23 (fig. opt.) ; Bp. Consp. p. 201.

Myrmonax longipes, Cab. Orn. Not. p. 210 ; Burm. Syst. Ueb. iii. p. 64.

Myiothera castanea, Licht. in Mus. Berol.

Myrmeciza longipes, Sclater, P. Z. S. 1855, p. 147 ; List of Bog. B. p. 19.

♂. *Castanea: pileo cinereo: gutture et pectore antico nigro: ventre albo, lateraliter rufescente.*

♀. *Guttur totum cum pectore clare rufis.*

Long. tota 5·7, alæ 2·6, caudæ 2·2, tarsi 1·15.

Hab. Venezuela; Trinidad; New Granada.

Mus. Brit., Berol., P. L. S.

6. MYRMECIZA ARGENTATA.

Herpsilochmus argentatus, Des Murs, Voy. Cast. et Dev. Zool. pl. 17. fig. 2. p. 53.

Fusca, subtus alba: lateribus capitis et corporis utrinque cum crisso et maculis tectricum apicalibus rubiginoso-rufis: rostro superiore nigro, inferiore albo: pedibus flavis.

Long. tota 5·7, alæ 2·7, caudæ 1·8, tarsi 0·95.

Hab. Upper Amazon, Nauta (*Cast. et Dev.*).

Mus. Paris., P. L. S.

I think this is very likely to be a female bird. My specimen, received from MM. Verreaux, agrees perfectly with the type in the Paris Museum.

Genus X. HYPOCNEMIS.

Hypocnemis, Cab. Orn. Not. 1847, p. 212.

Rostrum validiusculum, ad basin latius, apicem versus compressum, dente finali distincto: cauda brevis, paulo rotundata; rectricibus duodecim; acrotarsiis plerumque divis, paratarsiis integris.

1. HYPOCNEMIS CANTATOR.

Le Carillonneur de Cayenne, Buff. Pl. Enl. 700.

Turdus cantator, Bodd. Table d. Pl. Enl.

Turdus tintinnabulatus, Gm. S. N. p. 826.

Hypocnemis tintinnabulata, Cab. Orn. Not. p. 212. pl. 4. fig. 5; Schomb. Guian. iii. p. 684; Bp. Consp. p. 202.

Myiothera margaritacea, Licht. in Mus. Berol.

Myrmothera campanella, Vieill. Enc. Méth. p. 681.

Thamnophilus striatus, Spix, Av. Bras. ii. p. 29, pl. 40. fig. 2.

♂. *Schistacea: capite nigro; linea verticali et superciliis albo variegatis: interscapulii plumis ad basin albis, ad apicem nigris: uropygio et hypochondriis ferrugineis: gula, pectore et ventre medio albis, lateraliter nigro variegatis: alarum tectricibus nigris albo terminatis: cauda fusca, apice albida.*

♀. *Rufescentior: pilei et tectricum alarum maculis pallide rufis nec albis.*

Long. tota 4·8, alæ 2·3, caudæ 1·5.

Hab. Cayenne (*Buff.*); Brit. Guiana (*Schomb.*); Upper Amazon, Eastern Peru, Chamicurros (*Hauxwell*); Rio Napo.

Mus. Brit., P. L. S.

2. HYPOCNEMIS PÆCILONOTA.

Myiothera pæcilonota, Cuv. in Mus. Paris. ; Puch. Ann. du Mus. vii. p. 337.

Hypocnemis pæcilonota, Cab. Orn. Not. p. 213, pl. 4. fig. 2 ; Schomb. Guian. iii. p. 684 ; Bp. Consp. p. 202.

♂. *Obscure cinerea, tectricum alarium, secundariorum, interscapulii et caudæ tectricum plumis nigris albo marginatis : cauda nigra fascia mediana et altera apicali e maculis rotundis alba.*

♀. *Pileo ferrugineo, supra rufo varia.*

Long. tota 5·3, alæ 2·6, caudæ 1·7.

Hab. Brit. Guiana (Schomb.) ; Upper Amazon, New Granada, Bogota.

Mus. Brit., P. L. S.

3. HYPOCNEMIS MYIOTHERINA.

Thamnophilus myiotherinus ♂, Spix, Av. Bras. ii. pl. 42. fig. 1.

Myiothera thamnophiloides, Voigt, Thierr. i. p. 494.

Myrmonax myiotherinus, Cab. Orn. Not. p. 210.

Drymophila myiotherina, Bp. Consp. p. 202. sp. 4.

Hypocnemis melanolema, Sclater, P. Z. S. 1854, p. 254. pl. 72. fig. 2.

Hypocnemis myiotherina, Sclater, P. Z. S. 1856, p. 146.

Cinerea, subtus valde dilutior ; interscapularium basibus niveis ; loris et oculorum ambitu cum cervice laterali et gutture toto nigris ; linea superciliari indistincte albida ; tectricibus alarum nigris, fascia terminali alba ; remigibus et rectricibus fuscis, externe cinereis ; rostro nigro, pedibus pallidis.

Long. tota 5·0, alæ 2·5, caudæ 1·6.

Hab. New Granada, Bogota ; Eastern Peru, Chamicurros (Hauzw.) ; Upper Amazon.

Mus. Brit., P. L. S.

I do not believe *Myiothera ardesiaca* of Prince Max of Neuwied to be the same as this species ; but I have never seen specimens of it. It is referred here by Cabanis and Burmeister.

4. HYPOCNEMIS MELANOSTICTA.

Hypocnemis melanosticta, Sclater, P. Z. S. 1854, p. 254. pl. 73. (♂ et ♀).

♂. *Ex cinereo olivascens ; interscapularium basibus niveis ; tectricibus alarum nigris, albo anguste terminatis ; loris et regione auriculari nigris : subtus cinerea, gutture toto et ventre medio albis ; punctis paucis rotundis in summo pectore nigris ; rostro nigro, pedibus pallidis.*

♀. *Supra rufescenti-olivacea, alarum tectricum marginibus et abdomine toto pallide ochraceis ; gutture albo nigro striato, collo sicut in mari punctato ; mandibulæ inferioris basi alba.*

Long. tota 5·0, alæ 2·5, caudæ 1·6.

Hab. Eastern Peru, Chamicurros (Hauzw.).

Mus. Brit., P. L. S.

I have lately begun to suspect that these birds are the young male and the female of the preceding species. If such be the case, *H. elegans* is no doubt also a female, and perhaps *H. erythrophrys* the female of *H. leucophrys*!

5. HYPOCNEMIS ELEGANS.

Hypocnemis — ?, Sclater, P. Z. S. 1855, p. 147; List of Bog. B. p. 19.

Hypocnemis elegans, Sclater, P. Z. S. 1857, p. 47.

Olivaceo-brunnea, fronte et superciliis rufescentibus: capitis lateribus et regione auriculari nigris: tectricibus alarum nigris rufescente terminatis: gutture albo, abdomine cinnamomeo; collo antico striis quibusdam nigris maculato.

Long. tota 4·75, alæ 2·6, caudæ 1·6.

Hab. New Granada, Bogota.

Mus. Brit., Paris., P. L. S.

6. HYPOCNEMIS LEUCOPHRYS.

Hypocnemis myiotherina, ♀, Spix, Av. Bras. ii. pl. 42. fig. 2.

Pithys leucophrys, Tsch. Faun. Peruan. p. 176. pl. 11. fig. 2?

Myrmonax leucophrys, Cab. Orn. Not. p. 211.

Pithys leucophrys, Bp. Consp. p. 203.

Hypocnemis leucophrys, Sclater, P. Z. S. 1855, p. 146.

Cinerea, gutture nigricante: fronte et superciliis latis albis.

Long. tota 4·7, alæ 2·6, caudæ 1·7.

Hab. Eastern Peru (Tsch.); Upper Amazon; New Granada, Bogota; Brit. Guiana (Schomb.).

Mus. Brit., P. L. S.

7. HYPOCNEMIS ERYTHROPHRYS.

Conopophaga angustirostris, Cab. in Schomb. Guian. iii. p. 685?

Pithys erythrophrys, Sclater, P. Z. S. 1854, pl. 72. fig. 1.

Hypocnemis erythrophrys, Sclater, P. Z. S. 1856, p. 146.

Olivaceo-brunnea, subtus alba: fronte et superciliis latis ferrugineo-rufis: loris et regione oculari nigris: alarum tectricibus albo terminatis.

Long. tota 4·5, alæ 2·7, caudæ 1·7.

Hab. New Granada, Bogota.

Mus. Brit., Paris., P. L. S.

8. HYPOCNEMIS SCHISTACEA, sp. nov.

♂. *Carulescenti-schistacea unicolor: tectricum alarum omnium apicibus minute albo punctatis: rostro et pedibus nigris.*

Long. tota 5·0, alæ 2·5, caudæ 2·0.

Hab. Upper Amazon; Rio Javarri (Bates).

Mus. Brit.

In the general form and somewhat slenderness of the bill this species resembles *H. erythrophrys*; but its uniform colouring renders

it easily distinguishable from that and other described members of the genus.

9. HYPOCNEMIS MELANOPOGON.

Hypocnemis melanopogon, Sclater, P. Z. S. 1857, p. 130.

♂. *Cinerea, subtus dilutior, ventre medio albicante; gula nigra: alis brunnescenti-nigris, tectricibus omnibus albo marginatis: cauda nigra, reatricibus omnibus anguste albo terminatis: rostro nigro, pedibus fuscis.*

♀ aut ♂ jun. *Supra mari adulto similis, subtus gutture et pectore cinereo variegatis; abdomine albo, lateraliter cinerascens.*

Long. tota 4·5, alæ 2·5, caudæ 1·5.

Hab. Eastern Peru, Chamicurros (*Haurwell*).

Mus. Brit., P. L. S.

10. HYPOCNEMIS THERESÆ.

Conopophaga theresæ, DesMurs, Voy. Casteln. Ois. p. 51. pl. 16. fig. 2 (♀).

♂. *Supra cinerea: interscapulii macula magna celata alba: dorso medio et alis nigris, maculis magnis rotundis albis variegatis: subtus alba, gula et vitta lata pectorali e maculis confluentibus nigra: lateribus et crisso pallide cervinis: rectricum apicibus albo maculatis: rostro nigro; pedibus flavis.*

♀. *Magis rufescens, subtus pallide cervina; gula alba nec nigra: maculis corporis superi pallide cervino-flavidis nec albis.*

Long. tota 4·5, alæ 2·5, caudæ 1·6, tarsi 0·8.

Hab. Rio Javarri (*Cast. et Dev.*).

Mus. Brit., Paris., P. L. S.

11. HYPOCNEMIS NÆVIA.

Fourmillier tacheté de Cayenne, Buff. Pl. Enl. 823. fig. 1.

Pipra nævia, Gm. S. N. i. p. 1003.

Conopophaga nævia, D'Orb. Voy. p. 186; Bp. Consp. p. 203.

Rhopothera punctulata, DesMurs, Voy. Casteln. Ois. p. 53. pl. 17. fig. 3 f (♀).

♂. *Cinerea: interscapulii macula magna celata alba: dorso et alis nigris albo guttatis; rectricum apicibus albo quoque maculatis: subtus alba, gutture et vitta pectorali e striis confluentibus nigra: rostro nigro: pedibus pallide cinereis.*

♀. *Magis rufescens: maculis corporis superi pallide cervinis: gula alba.*

Long. tota 3·75, alæ 2·1, caudæ 1·1, tarsi 0·7.

Hab. Cayenne; Upper Amazon (*Bates*); Rio Javarri (*Cast. et Dev.*).

Mus. Brit., P. L. S.

Very like the preceding species, but distinguishable by its smaller size, shorter tail, remarkably short tarsi, and cinereous, not yellow, feet.

12. HYPOCNEMIS NÆVIODES.

Conopophaga nævioides, Lafr. R. Z. 1847, p. 69; Bp. Consp. p. 203.

♂. *Rufo-cinnamomea : capite griseo : alis nigris, rufo-cinnamomeo bifasciatis ; tectricibus minoribus albo guttulatis, primariarum marginibus et secundariorum apicibus pallide rufis : subtus alba, gutture et maculis crebris vittam pectoralem formantibus nigris : rostro nigro, pedibus plumbeis.*

♀. *Gutturē albo : maculis pectoris evanescentibus.*

Hab. Panama (*Delattre*) ; Mosquito Coast (*Bell*).

Mus. Derbium.

I have seen a pair of this species in the Derby Museum at Liverpool; and the same bird is represented in some drawings by Mr. Bell of the birds of the Mosquito Coast.

2. DESCRIPTION OF NEW PINNÆ. BY SYLVANUS HANLEY.

PINNA STRANGII. *P. testa late trigona, satis valida, magis minusve ventricosa, carinæ centralis experte, livido-purpureo in cornu colore inferne pallescente : triangulo dorsali costis permultis (circiter 20) angustis rotundatis et manifeste elevatis instructo ; triangulo ventrali lato, antice asperato et (in exemplis eximiis) plicis magnis conspicuis undatis arcte ornato, postice leviusculo : margine ventrali antice subsinuato, postice aliquantum pendulo, margini dorsali subrecto subæquali : extremitate postica truncata, subretusa.*

Long. 6, lat. $8\frac{1}{2}$ poll.

Hab. Sinus Moretonianus (*Strange*).

Mus. Cuming.

Although in adult examples the ribs appear unarmed and become obsolete near the broader end of the shell, in all probability the immature examples are spinous. The shagreening of the ventral triangle is very conspicuous.

PINNA CUMINGII. *P. testa late cuneiformi, satis valida, ventricosa, carinæ centralis experte, fulva, brunneo-purpurascens partim fucata, costis magnis rotundatis valde elevatis et squamis fornicatis maximis, quæ cava tubera denique fiunt, arcte armatis, instructa : squamis costisque aræ ventralis (plicarum expertis) minoribus : margine ventrali antice valde sinuato, postice pendulo, margini dorsali concavo subæquali : extremitate postica subtruncata, convexa.*

Long. $4\frac{1}{2}$, lat. $7\frac{1}{2}$ poll.

Hab. Peruvia.

Mus. Cuming.

The description has been solely derived from the unique example in Mr. Cuming's collection, and may consequently hereafter require some little emendation. Almost the entire surface is covered with ribs, of which there are from nine to eleven (two being smaller than

the rest) upon the dorsal or upper triangle. The great bubble-like laterally incoiled scales seem disposed to encroach upon the comparatively narrow intervals of the ribs. The nacre is dusky.

PINNA GOULDII. *P. testa late et obtuse cuneiformi, subventricosa, carinae centralis experte, fulva, purpureo-vinosa antice nebulosa et postice (in costas) radiata; costis (in exemplis adultis) paucis, depressis, remotis, angustis, postice subexoletis et squamis longiusculis subcylindraceutis parce armatis: area ventrali latiuscula in exemplis adultis sublaevigata: margine ventrali sinuoso, et margini dorsali retuso vel subrecto subaquali: extremitate postica pendula, rotundata, haud obliqua.*

Long. $3\frac{1}{2}$, lat. $6\frac{1}{2}$ poll.

Hab. "Amboyne" (in museo Cumingiano).

This beautifully painted shell approaches *verillum* in general aspect, and agrees in many respects with the description of *senticosa*. The hinder extremity of the latter, which is stated to be subinflated, is declared to be oblique, a most important distinction in the genus *Pinna*.

Besides some scarcely raised anterior interstitial riblets, there are about five or six armed ribs, whose diminished elevation at the broader extremity renders them more perceptible from their purplish hue than from their projection.

PINNA ASSIMILIS. *P. testa cuneiformi, subata, subventricosa, carinae centralis experte, cornea, antice fumoso-purpurascens palide tincta, squamis fornicatis longis in costas multas angustas subrotundatas subconfertas dense instructa: area ventrali scabra late, sed obsolete, plicata, haud costata: margine ventrali valde sinuoso, et margini dorsali subretuso subaquali: extremitate postica truncata, subpendula.*

Long. (exempli parvi) $2\frac{3}{4}$, lat. $5\frac{1}{2}$ poll.

Hab. Portus Essingtonianus.

Mus. Cuming.

One of the many species without salient characteristics. It closely approaches both *alta* and *rigida*.

3. DESCRIPTION OF A NEW ONISCIA. BY SYLVANUS HANLEY.

(Mollusca, Pl. XLII. figs. 9, 10.)

ONISCIA PONDEROSA. *O. testa late et obtuse trigona, ponderosa, alba brunneo punctulata, eodemque colore (praesertim infra suturam) sparsim maculata: spira vix totius longitudinis sextam partem implente, transversim striata, anfractibus ejus perbrevis, postice subcrenato-marginatis, antice crasse nodosis: area infra-suturali sublate concava, subangulata: anfractu ultimo transversim cingulato, postice nodis grandibus longitudinaliter nodoso; cingulis alternis nodulosis, nodulis subremotis: labro crassis-*

simo punctulis confertissimis brunneis transversim virgato, et lyris remotis intus dentato: columella subaurantia, haud granosa, juxta aperturam albam transversim lyrata, maculis angularibus brunneis variegata.

Long. $1\frac{1}{2}$, lat. $1\frac{1}{4}$ poll.

Hab. —?

Mus. Cuming.

Resembles a *Cypræassis*. The sculpture is very coarse, and the lip extends up the penult whorl, so as to be nearly on a level with the apex.

4. DESCRIPTIONS OF TEN NEW SPECIES OF BULIMUS, FROM THE COLLECTION OF H. CUMING, ESQ. BY DR. L. PFEIFFER.

(Mollusca, Pl. XLII. fig. 1-8.)

1. *BULIMUS PTYCHOSTYLUS*, Pfr. (fig. 7). *T. rimato-umbilicata, fusiformi-oblonga, solida, sublaevigata (sub lente irregulariter impressa); spira convexiusculo-turrila, apice obtusula; anfr. 7 convexiusculi, superiores albidii, fulvo rare strigati, ultimus spira brevior, spadiceus, albido-strigatus et maculatus, basi attenuatus; columella fortiter torto-plicata; apertura subverticalis, auriformis, intus nigrificanti-limbata; perist. simplex, albidum, marginibus approximatis, dextro late expanso columellari per dilatato, patente.*

Long. 47, diam. 15 mill.

Hab. Province of Patas, Andes of Peru (Dr. Farris).

2. *BULIMUS CATAMARCANUS*, Pfr. (fig. 5). *T. profunde umbilicata, ovato-conica, solidula, irregulariter plicata et undique minute granulata, non nitens, albida; spira conica, obtusula; anfr. 6 convexi, ultimus spiram superans, antice ascendens, basi rotundatus; columella profunde et obsolete plicata; apertura verticalis, oblongo-ovalis; perist. simplex, marginibus approximatis, dextro ab insertione horizontaliter abeunte, late expanso; columellari per dilatato, fornicato.*

Long. 42, diam. 23 mill.

Hab. Province of Catamarca, Andes of Peru (Mr. Williams).

3. *BULIMUS PLATYSTOMUS*, Pfr. (fig. 2). *T. profunde umbilicata, oblongo-conica, solida, oblique striata, fulvo-albida, strigis irregularibus castaneis et fulvis picta; spira conica, apice subtruncata; anfr. $6\frac{1}{2}$ convexiusculi, ultimus spiram subaequans, antice leviter ascendens, basi compresso-rotundatus; columella fusco-violacea, profunde subplicata; apertura vix obliqua, intus ovalis, fulvida; perist. simplex, saturate fusco-violaceum, marginibus approximatis, dextro late expanso, columellari per dilatato, patente.*

Long. 40, diam. 18 mill.

Hab. Province of Patas, Andes of Peru (Dr. Farris).

4. *BULIMUS PATASENSIS*, Pfr. (fig. 6). *T. profunde rimato-umbilicata, ovato-conica, solidula, subargute striata, parum nitens, carneo-albida, sæpe spadiceo strigata et nebulosa; spira convexiusculo-conica, apice subacuta; anfr. 7, superi subplani, pænultimus convexior, ultimus spiram superans, antice leviter ascendens, basi rotundatus, juxta umbilicum subcompressus; columella fusco-violacea, profunde subplicata; apertura viz obliqua, ovalis, intus late violaceo-limbata; perist. simplex, margine dextro breviter expanso, columellari per dilatato, patente.*

Long. 47, diam. 24 mill.

β. *Testa tenuiore, saturate carnea, sæpe strigis obliquis fulvis picta. Hab. Province of Patas, Andes of Peru (Dr. Farris).*

5. *BULIMUS CÆRULESCENS*, Pfr. *T. umbilicata, ovato-oblonga, solidula, striata, cærulescenti-albida; spira elongata, apice acuta; anfr. 7½ convexiusculi, ultimus spira brevior, antice saturatius cærulescens, basi parum attenuatus, subcompressus; columella superne profunde dentato-plicata; apertura subverticalis oblonga, intus atro-fusca; perist. atro-fuscum, margine dextro breviter expanso, columellari libero, non reflexo.*

Long. 31, diam. 12½ mill.

Hab. Province of Patas, Andes of Peru (Dr. Farris).

6. *BULIMUS BINNEYANUS*, Pfr. (fig. 4). *T. umbilicata; ovato-conica, solida, conferte striata, opaca, cretacea, interdum radii fuscis fasciatim interruptis picta; spira conica, apice acutiuscula; anfr. 5½ subplani, exserte carinati, ultimus non descendens, spiram æquans, infra carinam acutam turgidus, circa umbilicum infundibuliformem pervium viz compressus; apertura obliqua, irregulariter rhombea, fundo fuscula; perist. simplex, acutum, sordide purpurascens, margine dextro expanso, columellari late patente.*

Long. 26, diam. 19 mill.

Hab. Province of Patas, Andes of Peru (Dr. Farris).

7. *BULIMUS WILLIAMSI*, Pfr. (fig. 1). *T. imperforata, subulata, solidula, striatula, alba, strigis saturate castaneis, deorsum saturatioribus et crebrioribus picta; spira turrita, apice obtusula; anfr. 8 planiusculi, ultimus ½ longitudinis non attingens, basi compressus; apertura viz obliqua, oblonga; perist. simplex, rectum, marginibus subparallelis, columellari tenui, adnato.*

Long. 24, diam. 6½ mill.

Hab. Province of Catamarca, Andes of Peru (Mr. Williams).

8. *BULIMUS VESPERTINUS*, Pfr. (fig. 3). *T. subperforata, oblongo-fusiformis, tenuiuscula, irregulariter (interdum levissime) striata, nitidula, albido-rosea, strigis spadiceis, irregulariter albo-adspersis, ornata; spira conica, apice acutiuscula, nigricans; anfr. 6½-7 convexiusculi, ultimus spiram paulo superans, basi attenuatus, croceus; columella filaris, subrecedens; apertura viz obliqua.*

acuminato-oblonga, intus rubra, strigata, nitida; perist. simplex, rectum, margine columellari sursum sensim dilatato, subappresso.
Long. 36, diam. 14 mill.

Hab. Province of Patas, Andes of Peru (*Dr. Farris*).

9. *BULIMUS FARRISI*, Pfr. (fig. 8). *T. anguste umbilicata, fusiformi-turrita, solidula, longitudinaliter subremote pliculata et conferte striolata, striis spiralibus levibus decussatula, albida vel rosea, plerumque strigis et maculis pellucidibus fuscis vel rubris signata; spira elongato-conica, apice acutiuscula, crocea; anfr. 6½–7 planiusculi, ultimus spiram subæquans, vix ventrosior, basi attenuatus; columella superne levissime plicata; apertura parva obliqua, acuminata, oblongo-ovalis, intus fusco-crocea; perist. simplex, rectum, margine columellari superne dilatato, fornicatim reflexo.*

Long. 47, diam. 16 mill.

Hab. Province of Patas, Andes of Peru (*Dr. Farris*).

10. *BULIMUS CLATHRATUS*, Pfr. *T. compresse umbilicata, fusiformi-oblonga, tenuiuscula, plicatula, parum nitens, albida, strigis et fasciis angustis interruptis fuscis subclathrata; spira elongata, apice acutiuscula; anfr. 8 parum convexi, ultimus ¾ longitudinis vix superans, basi compressus; apertura vix obliqua, subrhombeo-ovalis; columella medio leviter torta; perist. simplex, rectum, margine columellari a basi dilatato, superne late patente.*

Long. 30, diam. 11 mill.

Hab. Province of Patas, Andes of Peru (*Dr. Farris*).

5. ADDITIONAL OBSERVATIONS ON THE GENUS *FURCELLA*.

By DR. J. E. GRAY, F.R.S., ETC.

Sir Everard Home figured, as I stated in my former paper, the fragment of the vaulted continuation of the tube that closes its lower ends, for the shelly valves of the animal. Considering this as an accidental mistake, I took no further notice of it. An eminent comparative anatomist having observed,—“In the great *Teredo arenaria*, which lives in soft mud, the valves are wanting, according to Dr. Gray, or their homologues form the convex cap closing the periodical growths of the calcareous tubes” (“Mollusca,” in *Ency. Britan.* 353), I feel it incumbent on me to show the reasons why I cannot consider the “convex caps” closing the calcareous tube to be the homologues of the true valves, which, in my paper, I have said are entirely absent.

First. The caps have the structure, and are continuations of the tube, and have no relation to the usual valves of the *Teredo* in their form or structure.

Secondly. The convex caps here referred to are evidently identical in structure and formation with the convex cap that is found on the end

of the tubes of the allied genera *Clavagella* and *Aspergillum*; and as these genera have the shelly valves of the animal in their proper situations, on the sides of the body, quite distinct from the convex caps, I think it is conclusive that they are not the *homologue* of the valves, in those genera, as both the valves and the caps which are considered as their homologue are present together, so that I must consider the convex cap in those genera as I do in *Furcella*, as only a continuation of the shelly tube in which the animal lives, and having no more affinity with the shelly valves than the tube of *Gastrochæna* and some *Lithodomi* and other perforating Mollusca.

Thirdly. It is to be remembered that some species of the true genus *Teredo*, which have distinct shelly valves, also form a shelly convex cap at the base of their tube in front of the animal, exactly similar in structure and situation to the cap of the genus *Furcella*, as I mentioned in my former paper; so that I cannot consider it only as a septum formed by the animal for its protection during the period of rest in those species of *Teredinidæ* which have true, well-developed, shelly valves, and the same convex caps as the homologue of the shelly valve in the genus of the family which are without true valves.

Hence I must continue to regard *Furcella* as a Conchifer without shelly valves or any part homologous to them; and if we were to find a Conchifer without valves, I should consider their absence would be most likely to occur in a family which have the valves in the normal members of it so reduced in comparison with the size of the animal as in *Teredinidæ*, where they have been regarded as "mere appendages of the foot;" and also being a family of Bivalve Mollusca, in which the animals always live in a shelly tube, it is one in which the valves are least required for their protection.

Since I sent in the former paper, I have had the opportunity of examining Mr. Cuming's series of *Furcella* from the Island of Camiguén, one of the Philippines, where they live in hard mud left exposed at very low water.

Mr. Cuming has several specimens of the tube of the young animal, which commence with a much smaller diameter than the specimen figured, and enlarge more rapidly in thickness, so that the tube is more conical. He has two examples of the base of the tube of larger specimens, which end in the cap formed of two overlapping arched plates, like the one figured, showing that to be the normal formation of the termination. All the specimens have two separate apical siphonal tubes.

He has also two specimens of the upper part of the tube, which are of a slender, elongated, nearly cylindrical form; both are pierced the whole length with two central semicylindrical tubes, separated by a narrow opaque septum. One of these specimens is water-worn, the other as fresh as if it had been broken from a living specimen; the latter shows at the fracture that the apex of the tube is formed of a number of concentric laminæ deposited one within the other. The two semicylindrical siphon tubes are surrounded with a special

opaque shelly lamina, the septum between them being of the same thickness and structure; and between the outer surface of this tube of the siphon and the inner surface of the cylindrical outer sheath or tube, there is deposited at each end of the central septum, between the two siphonal tubes, a transverse space filled with a loose, spongy, cellular shelly texture.

Mr. Cuming has two small tubes from California which appear to belong to the genus *Teredo*, which have the lower or larger end of the tube closed with a single hemispherical cap like those described in my former paper. In one the cap is simple and terminal, and the apex of the tube is oblong and quite simple; in the other the cap at the lower end of the tube is larger, rather distorted, and bent on one side of the axis of the tube, and the aperture at the apex of the tube is partially divided by a series of plates, which have a prominence in the middle on each side, forming an imperfect division of the cavity.

I may add, that the siphonal end of the tube being divided into two distinct tubes is not a distinctive character of *Furcella*, as we have in the British Museum a *Teredo* or rather a *Xylotrya* from Sierra Leone which has some of its tubes furnished with two distinct siphonal apertures, and others in which the tubes are only partially separated, and others with a simple aperture.

The Cloisonnaire de la Méditerranée of M. Matheron (Annales des Sciences et de l'Industrie du Midi de la France, vols. 1 & 2), quoted by Deshayes (Ann. Sci. Nat. xi. 245), is evidently a *Teredo*, furnished with shelly valves and palettes, and not a *Furcella*.

6. ON A NEW GENUS AND SEVERAL NEW SPECIES OF UROPELTIDÆ, IN THE COLLECTION OF THE BRITISH MUSEUM. BY DR. J. E. GRAY, F.R.S., V.P.Z.S., F.L.S., PRES. ENT. SOC., ETC.

These animals, when first discovered, were arranged with *Typhlops* by Schneider; and afterwards Cuvier, who had previously regarded them as belonging to that genus, formed for some of them a genus under the name of *Uropeltis*. In the 'Catalogue of the Specimens of Lizards in the Collection of the British Museum' (12mo. 1845), I formed for them a family under the name of *Uropeltidæ*, and divided the species into three genera, each containing a single species. Lately I described a fourth genus named *Morina* in the 'Proceedings' of this Society (1858).

Professor Johann Müller, in an article on the 'Osteology of Reptiles' in Tiedemann's 'Zeitschrift für Physiologie' for 1831 (vol. iv.), gave an account of the osteology of the two genera *Rhinophis* and *Uropeltis*. Schlegel in 1837 regarded them as a genus under the name of *Pseudotyphlops*, and noticed three species.

Having occasion to re-examine the various specimens which we have received since the printing of the Catalogue above referred to, I have found several additional species.

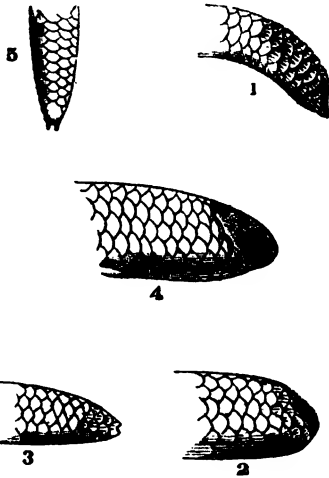
The family may be divided into three groups, according to the form of the tail.

I. *The tail obliquely truncated with a flat superior disk.*

1. **SILOBOURA.** Disk oblong, covered with separate, two or four keeled scales.
2. **UROPELTIS.** Disk circular, covered with a single tubercular plate.

II. *The tail subtruncate ; end convex, rounded, covered with a single horny tubercular shield.*

3. **MYTILIA.** Caudal shield many-keeled ; nose more or less acute.



1. *Siloboura Elliotti.*
2. *Mytilia Templetonii.*
3. *Plectrurus Perrotetti.*

4. *Mytilia unimaculata.*
5. *Mytilia melanogaster.*

III. *Tail oblong, compressed, covered with separate 3-keeled scales ; tip covered with a small compressed cap-like spinose shield.*

4. **MAUDIA.**

Instead of this family being characterized by the tail being "cylindrical, obliquely truncated above," it ought to be described as tail cylindrical or compressed, covered with keeled scales, which are separate or more or less united into a horny shield,—the scales on the tip of the tail being always united and many-keeled.

1. *Tail cylindrical, obliquely truncated, with a flat superior disk.*
Uropeltina.

1. SILOBOURA, Gray.

Tail obliquely truncated ; disk oblong, covered with rhombic, two- or four-keeled scales, the scales on the lower edge of the disk larger, tubercular above, and having two acute tubercles on its sharp lower edge.

* *Scales of caudal disk four-keeled.*

1. SILOBOURA ELLIOTI (fig. 1). B.M.

Siloboura ceylonica, Gray, Cat. Brit. Mus. 142 (not Cuvier).

Caudal disk oblong, elongate; scales of the disk four-keeled; brown, with a narrow yellow streak on each side of the neck, a broad yellow band in front of the vent continued in a band on each side of the tail.

Var. Larger scales of caudal disk three- or four-keeled.

Hab. Madras (*Walter Elliot, Esq.*).

** *Scales of caudal disk two-keeled.*

2. SILOBOURA CEYLONICA. B.M.

Uropeltis Ceylonicus, Cuvier, R. A. ii. 76; Cocteau, Mag. Zool. 1833, t. 2 (not *S. Ceylonica*, Gray, Cat.); Müller in Tiedemann's Zeitsch. Phys. iv. 252, 273. t. 21. f. 4, 5, skull?

Siluboura Ceylonicus, Kelaart, Prod. Fauna, 156.

Pseudotyphlops ceylanicus, Schlegel, Abbild. 45.

Coloburus Ceylonicus, Dum. & Bib. Erp. Gen. vii. 164. t. 59. f. 3.

Caudal disk roundish, oblong; scales of disk two-keeled; black, a broad irregular yellow band on each side of the neck from the angle of the mouth, and some yellowish marbling on the sides of the body becoming more obscure behind; a broad yellow cross band in front of the vent, continued in a broad band to the sides of the tail.

Hab. Ceylon.

2. UROPELTIS.

Tail obliquely truncated; disk roundish, covered with a single flat roundish-granulated shield.

1. UROPELTIS GRANDIS. B.M.

Uropeltis (sp. ?), Kelaart, Prodromus, 155.

"*Uropeltis grandis*, Kelaart." In Brit. Mus.

Caudal disk subcircular, with large scattered tubercles; nose subacute, rather produced; dark brown; chin and beneath yellowish brown, with some of the scales dark brown in the centre near the hinder edge.

Hab. Ceylon (*Kelaart*). Dr. Kelaart's type specimen.

2. *UROPELTIS PARDALIS*.

B.M.

"Uropeltis pardalis, Kelaart."

Nose convex, rounded; caudal disk subcircular, scarcely tubercular; back black, with numerous small white specks on the back and sides; caudal disk brown, smooth, with a narrow white edge above and a white spot on each side of the lower edge; belly white, three or four irregular rows of oblong transverse black spots.

Hab. Ceylon (*Kelaart*). Dr. Kelaart's type specimen.

3. *UROPELTIS? PHILIPPINUS*.

Uropeltis Philippinus, Müller, Thienem. Zeitsch. für Physiol. iv. 248, 274. t. 22. f. 1 *a, b, c*, skull; f. 3, animal nat. size; Dum. & Bib. Erp. Gen. vii. 161. t. 59. f. 2.

Rhinophis Philippinus, Boie, Isis, 1827, 513; Müller, l. c. 248.

Typhlops Philippinus, Cuvier, R. Anim. ii. 72.

Pseudotyphlops philippinus, Schlegel, Abbild. 44 (not figured).

Hab. Philippines.

This species is unknown to me. One specimen in the Paris Museum.

II. *The tail cylindrical, subtruncate; end covered with a single horny convex tuberculated shield; nose acute.*

3. *MYTILIA*.

Caudal disk convex, covered with a single convex shield, covered with small spine-like ridges; rostral scales produced, more or less acute.

Rhinophis, Dum. & Bib. Erp. Gen. vii. 150.

* *Caudal shield with a slight perpendicular keel; rostral scales square, rather acute.*

1. *MYTILIA GERRARDI*.

B.M.

Mytilia Gerrardi, Gray, Proc. Zool. Soc. 1858, p. 57. Rept. pl. 13.

Caudal disk large, with a slight perpendicular terminal keel; black; white spot over the upper edge of disk.

Hab. Ceylon (*R. Templeton, Esq.*, 1845).

2. *MYTILIA TEMPLETONII* (fig. 2).

B.M.

Caudal disk small, covered with radiating lines of uniform spines, with a slight perpendicular apical keel; blackish-brown, with the middle of the scales rather paler, a large irregular yellow streak on each side of the neck, and a few yellow cross-bands on the sides, becoming small and more indistinct behind; a yellow spot on each side of the vent, extending in an irregular narrow line to the end of the tail.

Hab. Ceylon (*R. Templeton, Esq.*).

**** Caudal shield convex, rounded, without any terminal keel; rostral shield compressed, produced, very acute.**—? *Rhinophis*, *Hempr.*

3. MYTILIA UNIMACULATA (fig. 4).

B.M.

Uniform grey-brown (in spirits), with pale edges to the scales, those of the under side being the broadest, with a single oblong transverse yellow spot in front of the vent.

Hab. Ceylon (*Thwaites*).

We have two specimens of this species,—one not in a good state, rather discoloured, being uniform red-brown, from the Haslar collection, and another, in good state, received from Mr. Thwaites in 1856. They both have the same preanal spot and keelless caudal shield.

The species is most like the *Pseudotyphlops oxyrhynchus* figured by Schlegel, Abbild. 43. t. 12, which is said to be the *Typhlops oxyrhynchus* of Schneider, Amph. ii. 341; the *Rhinophis oxyrhynchus*, "Hemp. Berl. Mag.," Wagner, Syst. Amp. 195; the *Rhinophis punctata*, Müller in Tiedem. Zeitsch. Physiol. ii. 248, 273. t. 21. f. 1, 2, 3, skull; t. 22. f. 1, head shield; f. 1, *d, e, f*, caudal disk, which Schneider says came from Coromandel, and Professor Johann Müller from Guiana: but I think the latter must be a mistake, as no species of the family has yet been found on the Western continent. The specimen figured by Schlegel in the Leyden Museum differs from the one here described, chiefly in having no yellow spot in front of the vent, and in being provided with a dark spot in the centre of the scales, forming a central and some lateral lines on the back, and a single line of spots on the underside of the tail and the hinder part of the belly near the vent. I have no specimen which agrees with it in these characters.

It is doubtful if Schlegel's figures of this genus differ from *Morina*; but Professor John Müller describes the tail as covered at the end with a "hard oval horny shield," and he says *Uropeltis* has a caudal shield exactly like *Rhinophis*, and rough with granulations; he further observes that there is no other difference between the external form and the skull of the genera, except in the form of the rostral shield, which in *Rhinophis* is sharp and keeled and produced. At any rate *Rhinophis* and *Morina* were not established on the same kind of characters, and the sharpness or bluntness of the rostral shield differs in the species of both genera; and though the name and character is applicable to this kind, the nose of the other species of the genera more resembles that of genera *Siloboura*, *Uropeltis*, and *Maudia*.

***** Caudal shield small, with a terminal transverse dentated keel; rostral shield square, rather acute.**—*Crealia*.

4. MYTILIA MELANOGASTER (fig. 5).

Above brown (in spirits), with indistinct pale lines between the series of scales, formed by very small pale dots on the outer sides of

the scales; sides white from lips to vent; belly black, white-spotted; tail above and below like the back, dark, with indistinct pale lines; caudal shield tridentate at the tip.

Hab. Ceylon (*Thwaites*).

We procured through Mr. Cuming two specimens of this species, which were sent home by Mr. Thwaites in 1854.

See also—

1. *Rhinophis Philippinus*, Dum. & Bib. Erp. Gen. vii. 134. t. 57. f. 1.
2. *R. oxyrhynchus*, l. c. 156.
3. *R. punctatus*, l. c. 157, only known from figures.

III. *Tail oblong, compressed, covered with separate three-keeled scales; tip covered with a small compressed cap-shaped spinose shield.*—Plecturina.

4. PLECTRURUS.

Tail oblong, compressed, covered with separate three-keeled scales; apex furnished with a small compressed cap-shaped shield, covered with small spines, and ending in a central perpendicular spinose keel. Nose rounded, rather produced. The central ventral series of scales rather broader than the other scales, six-sided.

1. PLECTRURUS PERROTETTI (fig. 3). B.M.

Pale brown (in spirits), paler beneath, with a more or less large or distinct oblong transverse yellow spot in front of the vent.

Plectrurus Perrotetti, Dum. & Bib. Erp. Gen. vii. 167. t. 59. f. 4, skull; t. 76. f. 1.

Hab. Madras (*J. C. Jerdon, Esq.*, 1846); "Neelgherries."

Var. 1. With series of obscure small pale spots between each series of the dorsal scales.

Var. 2. Tail with a central line of white spots on the upper side, and with a row of white spots on each side near the vent, converging and united in the middle of the end of the tail; hinder part of upper lip white.

Var. 3. Scales of the tail nearly smooth; in other specimens these scales are very distinctly three-keeled.

We have a smaller specimen of this animal, which we received from the Fort Pitt Museum, as having been sent by Mr. Ford from the Cape of Good Hope; but as they had many specimens from India in that Museum, I suspect this habitat is a mistake, as the genus has not yet been received with certainty from Africa, and it is scarcely likely that an Indian species should be also found in that country.

7. ON CARPENTERIA AND DUJARDINIA, TWO GENERA OF A NEW FORM OF PROTOZOA WITH ATTACHED MULTILOCULAR SHELLS FILLED WITH SPONGE, APPARENTLY INTERMEDIATE BETWEEN RHIZOPODA AND PORIFERA. BY DR. J. E. GRAY, F.R.S. ETC.

Many years ago I observed on some specimens of *Cardita variegata*, which Mr. J. Ritchie, the late Consul of Tripoli, had collected at Marseilles and sent to the British Museum, some specimens of a parasitic shell which resembled a *Balanus* in shape, but when more carefully examined were evidently not formed in the same manner as the shells of that class of animals; but as they were not in a good condition, it was not easy to decide from what animal they derived their origin.

Mr. Cuming some years later, when he transmitted his collection of Cirripedes to Mr. Dawson for his examination, sent with them some shelly bodies attached to the surface of a *Porites* Coral, and different kinds of shells, as *Pecten* and *Cardita*, which that naturalist returned to Mr. Cuming as "not Cirripede," on which Mr. Cuming brought them to the British Museum, requesting me to examine and describe them. These specimens brought to my mind the shells I had formerly received from Mr. Ritchie, and a casual examination of their form and structure at once showed me that they could not belong to a *Cirripede*; and as they presented some characters which were not to be observed in the Mediterranean specimens, a careful study of them led me to consider them as nearly allied to the Foraminiferous shell, but differing from any form of them with which I was acquainted, in being permanently attached to marine bodies; and they were so unlike, both in size and form, to any shells of the kind previously known, that several persons to whom I had expressed this opinion doubted their affinity to them. I therefore laid the specimens aside, in hopes that some other specimens might occur that would more fully elucidate their structure, and show their affinity to other known animals.

Though most of the naturalists to whom I have shown Mr. Cuming's specimens were inclined to regard them as a peculiar form of *Cirripede* shell, each examination of them tended to strengthen my original opinion, that they were a new form of *Foraminifera*; and this was further confirmed when I accidentally discovered that the cells were filled with a fleshy substance, in which bundles of simple sponge-like spicula were imbedded. This induced me to show them to Professor George Busk, and to inquire of him if he had ever seen any coral, or other natural body, to which they could be allied. He stated that he had not, unless they were the shells of a *Cirripede*; and on my expressing to him the opinion I had formed of their probable formation and affinity, he stated that it was not impossible that I was right, and that they might be an intermediate form of *Rhizopod* between a *Foraminiferous* shell and a *Sponge*, which is exactly the idea I had formed of their position,

considering them as a Sponge that was surrounded by and provided with a shelly case with a single terminal *oscule*.

Being desirous of obtaining other opinions on the subject before publishing any account of them, I transmitted the specimens to my friend Dr. William Carpenter, stating my belief that they were a new form of *Rhisopod* which had been mistaken by several naturalists for the shell of a *Cirripede*, giving him permission to take off and examine one of the specimens. He has most kindly sent me the following note.

University Hall, April 23, 1858.

MY DEAR SIR,

Your guess was a very sagacious one. The structure of the shell is most characteristically *Foraminiferous*, being riddled full of holes like a *Rotalia*. In the interior of the only specimen I have laid open was a brownish animal residuum full of *Sponge spicules*. Of course there is no great improbability in the idea that the Sponge was parasitical; but I am inclined to believe that this organism is the connecting link which I have long thought must exist between Sponges and Foraminifera, and that it is in fact a Sponge whose integuments have been consolidated into a Foraminiferous-like shell. You will find that the interior is not one single undivided cavity, but that it is loculated; and sections of the shell show a sort of areolation corresponding with the little bosses of the exterior.

I do not think that you will satisfactorily elucidate the organization of this creature, unless you have several sections made in different directions through the shell. I have limited myself to the one which you gave me the liberty to break up, with which I have done the best I could. I should like to have these (two) slides back again, and to have one or two perfect specimens, if you could spare me a corner of your block.

Yours very truly,
WILLIAM CARPENTER.

This account exactly agrees with my previous examination, as it was the knowledge that the shell was multilocular and minutely foraminated like the multilocular Foraminifera, which induced me to regard them as the case of a *Rhisopod*; and the knowledge that the cells were filled with a fleshy substance strengthened with spicula like certain sponges, which induced me to believe that they were also allied to the Porifera or Sponges; and in my note to Dr. Carpenter transmitted with the specimen on the 21st of April, 1858, I stated that "I regarded it as a *Rhisopod* of a new form; it is formed of a number of cells each ending in a terminal pore. The cells look like the valves of a Barnacle, and that is the reason that Mr. Cuming and my German friend think it is one; but the examination of the structure at once proves that it cannot be one."

Being strengthened by the opinion of Professor Busk and Dr. Carpenter, I have ventured to bring the subject before the Society; and I propose to form for the Philippine specimens a genus which I shall

name *Carpenteria*, after Dr. William Carpenter, who has paid so much attention and has been so successful in elucidating the structure and organization of these animals, and who is also the son of

CARPENTERIA.

Fig. 1.

Fig. 2.



Fig. 1. Exterior surface complete.

Fig. 2. Partly eaten off by acid. a. Complete.

Fig. 4.

Fig. 3.

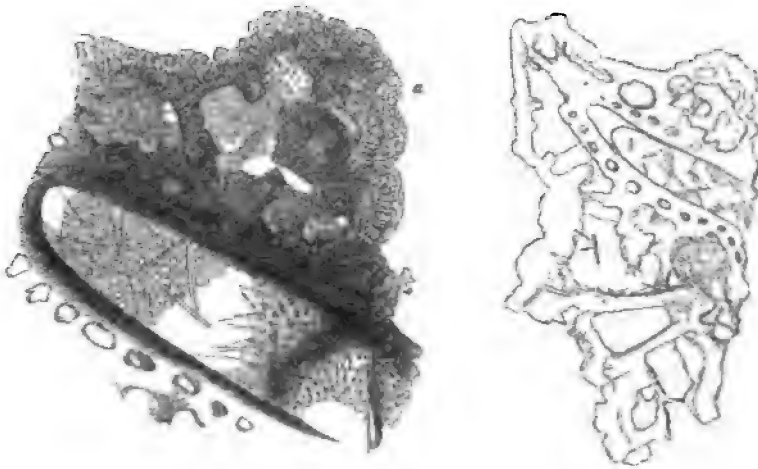


Fig. 3. Cross sunken cells, showing the spicula in the cells.

Fig. 4. Part of Fig. 3, more magnified. a. Outer parietes of cells.

my very dear friend Dr. Lant Carpenter, and the brother of Mr. P. P. Carpenter, to whom we are much indebted for the collection of Magellan Shells and the catalogue that accompanied it.

I shall merely give a slight description of the genus, sufficient to

distinguish it from other marine bodies, and send some of my specimens to Dr. Carpenter, in the hope that it will enable him to add a full account of its formation and structure to his paper on the Foraminiferous Shells which he is preparing for the Transactions of the Royal Society, assisted by the funds of that Institution.

1. CARPENTERIA.

Shell conical, attached by the broad base, formed of a series of elongated cells, each ending in a contracted mouth, piled one against another in a spiral manner, and with the aperture of the last cell at the apex in the centre of the acute cone. The substance of the cells is formed of a network of calcareous anastomosing ribs; the interspaces between the ribs are thin, calcareous, prominent externally, and pierced with numerous perforations. The cavity of the cells is filled with a fleshy sponge-like body, strengthened by numerous minute, simple, pin-shaped and fusiform smooth spicula placed in bundles.

C. BALANIFORMIS.

Hab. Philippine Islands, on *Porites*, *Cardita*, *Pecten* and other shells.

The conical shell is furnished with a single contracted aperture at the apex of the cone; as each cell is formed it closes the aperture of the preceding cell, so that only one is seen at the top of the cone. Some specimens show two or rarely three apertures at the tip of the cone; but this arises from the tip having been broken; these apertures are of a larger size and irregular form, very unlike the contracted uniform-shaped aperture of the last cell.

When the shell is worn, or partly destroyed by acid, the thin part between the network is destroyed, leaving only the calcareous ribs, which fill the greater part of the cavity, leaving a cavernous calcareous body somewhat like a sponge turned into stone.

A section of the parietes of the cells appeared to be formed of polyhedral plates separated from one another by a rather opaque line, as if formed by the union of the edges of the plates; and each plate is pierced with a number of uniform-sized, regularly disposed circular perforations, leaving a nearly uniform imperforated belt round the margin of each plate.

The specimens on the shells of *Cardita variegata* from the shores of the Mediterranean are so different in substance and structure from those found (on the same species of shell among others) on the shores of the Philippines, that I propose to form for them a second genus, named in honour of M. Felix Dujardin, the Professor of Biology and Dean of the Faculty of Sciences at Rennes, who first described the animal of the many-chambered microscopic shells, which had before been generally considered as the residence of Cephalopods! the most complicated organized mollusca, instead of the most simply organized animal.

2. DUJARDINIA.

Having the same external appearance and form as the preceding genus; that is, formed of cells aggregated together in a spiral form, the last cell being furnished with an apical opening; but the cells appear to have a simple cavity, and are formed of a thicker, harder, uniform shelly coat, which is very closely and uniformly pierced all over with very numerous, minute, equal-sized parallel pores. The cavity of the cell —? in the imperfect specimen which I have been able to examine, is simple; but then it has evidently been well-washed, probably with acid.

DUJARDINIA MEDITERRANEA.

Hab. Mediterranean; Marseilles, on *Cardita variegata* (J. Ritchie, Esq. 1817).

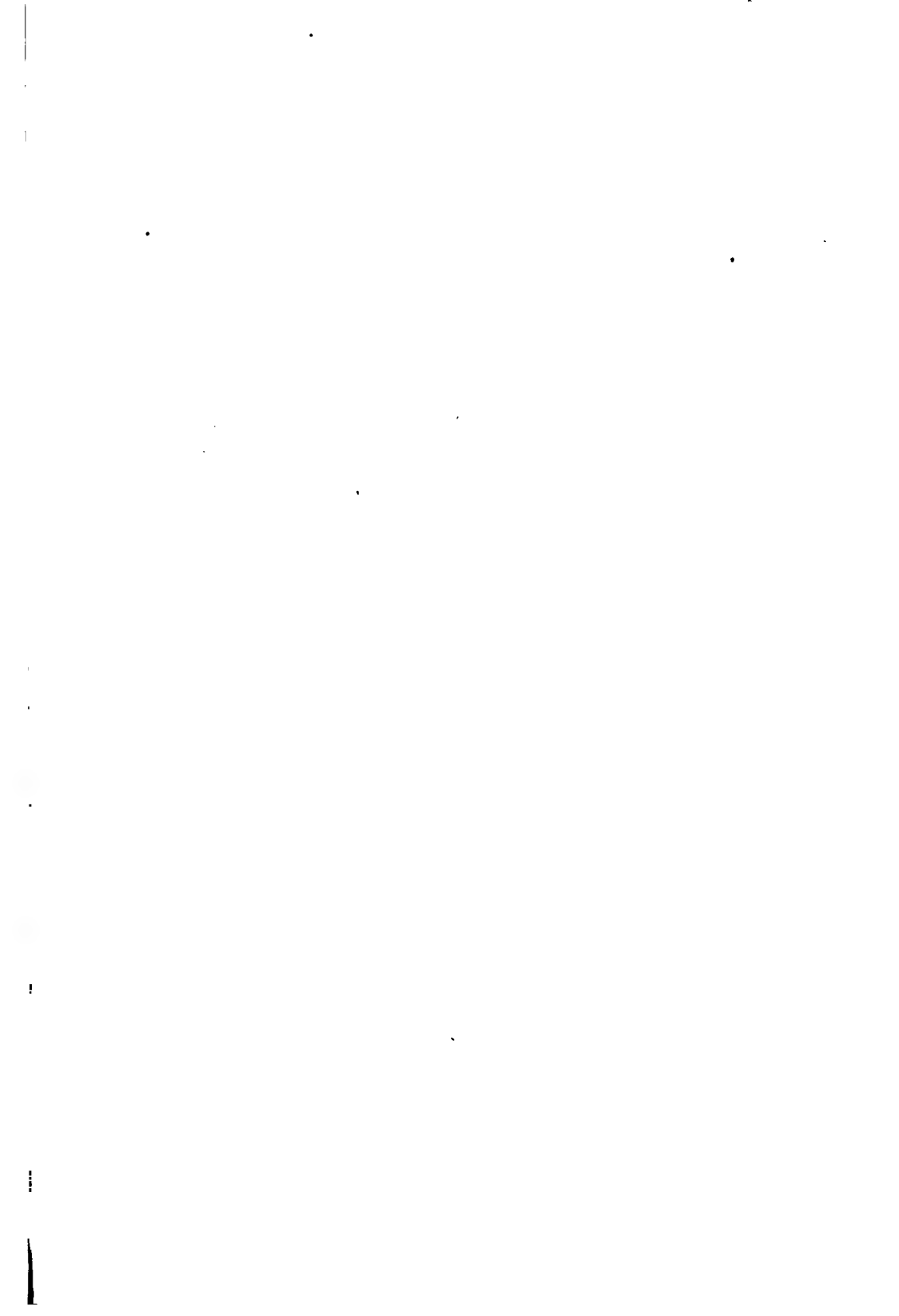
These genera appear to me to form a distinct group of *Rhisopoda*, which may be called *Fenestrifera*, which is characterized by the animal being always attached to marine bodies, and the cellular body of the animal being strengthened with spicula and enclosed in a calcareous cell furnished with a single contracted aperture and pierced with numerous foramens or tubes.

These shelly bodies differ from all the shells of *Rhisopods* hitherto known, in being attached, and in the form, structure, and disposition of the cells, which (should the existence of spicula on the body prove a peculiarity of the genus *Carpenteria*, where alone it has been observed) is sufficient to form a group distinct from the other *Rhisopods*.

The existence of these spicula shows that the genus *Carpenteria*, and probably all the group, forms the passage between the *Porifera* and *Rhisopods*, which has been long suspected to exist, but has not before been described.

On the Mediterranean specimens of *Cardita variegata* there is intermixed with the *Dujardinia* a species of *Lepralia*, the anomalous *Polytrema miniacum*, which is formed of numerous layers, one deposited on the other, each formed of a calcareous network, with small equal hexangular interspaces, undefined patches of a crust formed of rough calcareous cells placed side by side like the cells of a *Lepralia*, but much more unequal in size and irregular in form than the cells usually found in that genus. The parietes of these cells are pierced with numerous equal-sized minute pores like the foramens of *Foraminifera*, the whole substance of the cell being apparently formed of numerous short shelly tubes placed parallel side by side. The cells are furnished with a small roundish hole at one of their extremities, which is often hid by the convexity of the other cell.

This may be a peculiar genus of *Lepraliadae* allied by my genus *Cribrillina* (Cat. Brit. Radiata, pp. 116, 147), which has "foraminiferous cells," as Professor Busk calls them; or it may prove to be another form of *Foraminifera*. If the former, the form of the cells





and mouth, and the structure of the cell-walls, are sufficient to distinguish it from *Cribrillina*. As the only way to draw attention to it is to give it a name, I propose to form for it provisionally, until its nature is better understood, a genus named

PUSTULARIA.

Cells ovate, four- or five-angled, convex, crowded together side by side, forming a crust without any definite form; the cells closed, their entire parietes being pierced with numerous close uniform minute pores; the cavity simple; aperture small, roundish, simple at the front end of the cell (without any ovarian cells?).

1. PUSTULARIA ROSEA.

The crust rose-red, rather rugose.

Hab. Mediterranean.

8. NOTE ON THE EGG OF "THE MOORUK" (*CASUARIUS BENNETTI*, GOULD), FROM NEW BRITAIN, IN THE BRITISH MUSEUM. BY DR. J. E. GRAY, F.R.S., ETC.

(Aves, Pl. CXLIV.)

The British Museum having obtained from Mr. Samuel Stevens the egg of the *Mooruk* from New Britain (sent to him by Mr. Turner, which he wished to exhibit to the Society before he delivered it into the Collection), I am induced to send the following observations on it.

The egg is of the same form and has the same solid shell, covered with rounded tubercles, as that of the Common Cassowary, *Casuarus galeatus*.

It differs from the egg of the latter bird in the British Museum in being rather larger (it is $14\frac{1}{2}$ inches in circumference in the longest, and $11\frac{1}{4}$ inches in the thickest part), in the tubercles on the surface being larger, considerably further apart, and more isolated, that is to say, more rarely confluent together.

The egg is pale olive-green with darker olive tubercles; it is much darker than what I recollect of the eggs of the Cassowaries in other collections; but they may have become faded, as is the case with our specimens in the British Museum.

Mr. Bennett sent with the living specimen of the *Mooruk* now exhibited in the Menagerie, which he so liberally presented to the Society, an egg which was brought from New Britain with the bird. This egg has been presented by him, through the Society, to the British Museum.

This egg differs very considerably from that exhibited by Mr. Stevens: first, in being smaller, that is to say, only $13\frac{1}{2}$ inches in circumference in the longest and 11 inches in the thickest part; secondly, in the egg being blunter, more rounded in front, and not

so conical as the other ; thirdly, it is of a uniform pale olive-colour, without any appearance of tubercles or darker spots.

It has been suggested that the difference between the two eggs is so great that they cannot have been laid by the same species of bird. They both differ considerably from the egg of the Galeated Cassowary ; and Mrs. Turner assures me that they were both brought from New Britain, by her husband and the captain of the ship, with the living bird, to Sydney ; they were divided by lot, and he, having the choice, selected the tuberculated egg : so that, if they are not the eggs of the Mooruk, it would indicate that there must be two Cassowaries inhabiting New Britain, both different from *C. galeatus*.

There is so great a similarity in colour and texture of the smooth egg with the ground-colour of the other egg between the tubercles, that it has been suggested that the tuberculated egg is the perfect egg of the bird, and the smooth egg that of a very immature or sickly specimen ; but under any circumstances I have considered it desirable that both specimens should be figured.

May 11, 1858.

John Gould, Esq., F.R.S., V.P., in the Chair.

The following papers were read :—

1. SYNOPSIS OF THE AMERICAN ANT-BIRDS (FORMICARIIDÆ). BY PHILIP LUTLEY SCLATER. PART III. CONTAINING THE THIRD SUBFAMILY FORMICARIINÆ, OR ANT-THRUSHES.

(Aves, Pl. CXLIII.)

Subfam. III. FORMICARIINÆ.

Habitus magis turdinus : rostrum subulatum, validiusculum, rectum, apice incurva et dente finali instructa : alæ breves : cauda brevis, plerumque brevissima, vix rotundata sed plerumque quadrata : pedes magni, ambulatorii, tarsi longi, sæpe longissimi, digitis gracilibus et elongatis : ptilosis rufa et brunnea, nigro varia : sexus plerumque similes. In terra apud sylvas densas vivunt, ibique nidificant.

It is difficult, in this as in many other cases, to draw a precise line and say where the last subfamily ought to end and the present one to begin. In order to determine this accurately, it would be desirable to know a little more of the habits and other peculiarities of some of these birds. My idea is, that the present section ought to

include the Ant-birds which keep always on the ground, in contradistinction to those of the other subfamilies which live in the thickets near the ground, but are generally seen on the branches. Whether the genus *Pitta* and its allied forms of the Old World, which certainly show great outward resemblance to some of these birds, are to be placed near here in a natural arrangement, does not yet seem very certain. Cabanis in his 'Ornithologische Notizen,' leaves the question in doubt, while Prince Bonaparte, who in his 'Conspectus' excluded the *Pitta* from the Tracheophones "*geographia repugnante*," and placed them among the Oscines, in his more lately published arrangement has located them near the Rollers (*Coraciidæ*). For this there seems to be some ground in the formation of the skeleton, the thorax in *Pitta* having much of the same appearance as in the *Volatores*.

The series which I have arranged in this section is nearly the same as that included by Prof. Burmeister in his division "*Myiotheridæ*," with the exception of *Sclerurus*, which though somewhat intermediate in form, seems to me to fall more naturally into the *Dendrocolaptidæ* or *Anabatidæ*, where I assign to it the rank of a distinct subfamily.

Genus I. PITHYS.

Pithys, Vieill. Enc. Méth. p. 862 (1823).

Gymnopithys, Bp. Consp. Syst. Orn. p. 28 (1854).

Rostrum modicum : alæ subelongatæ : pedes subfortes ; acrotarsiis et paratarsiis integris ; digito externo cum medio usque ad secundum articulum conjuncto : cauda longior.

1. PITHYS ALBIFRONS.

Le Manikup de Cayenne, Buff. Pl. Enl. 707. fig. 1.

Pipra albifrons, Gm. S. N. i. p. 1000.

Myiothera albifrons, Licht. Doubl. p. 44.

Pithys leucops, Vieill. Enc. Méth. p. 862.

Dasycephala albifrons, Gray, Gen. i. p. 208.

Pithys albifrons, Cab. Orn. Not. p. 214 ; Bp. Consp. p. 203.

Olivascenti-cinereus, cervice undique et abdomine toto cum cauda saturate castaneis ; capite nigro ; crista frontali erecta et plumis mentalibus albis.

Long. tota 4·5, alæ 2·8, caudæ 1·5.

Hab. Cayenne ; New Granada, Bogota.

Mus. Brit., P. L. S.

b. *Gymnopithys*.

2. PITHYS RUFIGULARIS.

Le petit merle brun à gorge rousse de Cayenne, Buff. Pl. Enl. 644. fig. 2.

Turdus rufigula, Bodd. Table d. Pl. Enl.

Turdus pectoralis, Lath. Ind. Orn. i. p. 151.

Pithys pectoralis, Cab. Orn. Not. p. 214 ; Bp. Consp. p. 203.

No. CCCLXIV.—PROCEEDINGS OF THE ZOOLOGICAL SOCIETY.

Brunnescenti-olivaceus, subtus dilutior, gutture rufo, loris obscuris; macula dorsi celata, in mari alba, in fœmina pallide fulva.

Long. tota 5·0, alæ 3·1, caudæ 2·9.

Hab. Cayenne.

Mus. Berol., P. L. S.

3. PITHYS LEUCASPIS.

Myrmeciza leucaspis, Sclater, P. Z. S. 1854, p. 253. pl. 70; 1855, p. 147; List of Bog. B. p. 19.

Supra cinnamomeus, pileo intensiore: subtus albus, vitta laterali a loris ad inum pectus descendente utrinque nigra: ventre imo et lateribus olivascanti-cinnamomeus: macula dorsi celata pallide fulva.

Long. tota 5·5, alæ 2·8, caudæ 1·8.

Hab. New Granada, Bogota; Upper Amazon; Eastern Peru, Chamicurros (*Hauxwell*); Cobati, Rio Negro (*Wallace*).

Mus. Brit., P. L. S.

This is a typical *Pithys*, having the same formation of the bill, and the outer toes joined as in *P. albifrons*.

Genus II. GYMNOCICHLA.

Rostrum forte: pileus cum loris omnino denudatus: narium apertura antice posita, ovalis: alæ breves: pedes debiliores, digitis brevibus, unguibus brevibus nec validis; acrotarsiis divisis, paratarsiis integris.

1. GYMNOCICHLA NUDICEPS.

Myiothera nudiceps, Cass. Pr. Ac. Sc. Phil. v. 106. pl. 6.

Pyriglena nudiceps, Sclater, P. Z. S. 1854, p. 113.

♂. *Nigerrima, tectricibus alarum et cauda apicali anguste nigro marginatis; rostro et pedibus nigris.*

Long. tota 6·0, alæ 3·0, caudæ 2·3.

Hab. Panama (*Bell*); S. Martha, New Granada (*Verreaux*).

Mus. Brit., et Acad. Philadelph.

Genus III. MYRMELASTES.

Rostrum forte, ad basin latum, loris et regione oculari denudatis: alæ modicæ ad caudæ dimidium attingentes: cauda modica, rotundata: pedes validi, tarsi modice longi, acrotarsiis divisis, paratarsiis integris; digitis elongatis, validiusculis.

1. MYRMELASTES PLUMBEUS, sp. nov. (Pl. CXLIII. ♂ et ♀).

♂. *Nigricanti-plumbeus, alis caudaque obscure nigris; tectricum alarum apicibus albo guttatis; rostro et pedibus nigris.*

♀. *Mari similis, sed corpore toto subtus ferrugineo-rufo.*

Long. tota 6·0, alæ 3·1, caudæ 2·3, rostri a rictu 1·05, tarsi 1·2.

Hab. Upper Amazon, Rio Javarri (*Bates*).

Mus. Brit., P. L. S.

The British Museum possesses both sexes of this fine, strong Ant-thrush from collections lately transmitted by Mr. Bates from Ega, but originating, I believe, from further up the stream. I have a single male specimen from the same source. The female has so nearly the same general appearance as *Thamnophilus hyperythrus* ♂, that they might easily be confounded at first sight.

2. *MYRMELASTES NIGERRIMUS*, sp. nov.

Unicolor nigerrimus, tectricibus alarum superioribus, campterio proximis, albis.

Long. tota 6·5, alæ 3·3, caudæ 2·3, tarsi 1·3.

Hab. Upper Amazon (*Bates*).

Mus. Brit.

A single example of this bird occurred in the same collection as the former species, and is now in the British Museum. It is quite the same form as *Myrmelastes plumbeus*, with the exception of the bill being slightly shorter and the feet rather stronger. It is marked "Irides black, bill black." It is without doubt a male; and it will be interesting to see the female.

Genus IV. RHOPOTERPE.

Rhopoterpe, Cab. Orn. Not. in Wiegmann. Arch. 1847, p. 227.

Rostrum rectum, validum, elongatum: alæ elongatæ, remige tertio quartum quintum et sextum subæquante: tarsi validi sed breves; acrotarsiis divisæ.

This peculiar bird must come near *Formicarius*, but is at once distinguishable by its long wings and short tarsi. The two other species placed by Cabanis in this genus seem to me to have nothing to do with it. See *Myrmotherula gularis* and *M. guttata*.

1. *RHOPOTERPE TORQUATA*.

Le Fourmillier de Cayenne, Buff. Pl. Enl. 700. fig. 1.

Formicarius torquatus, Bodd. Table d. Pl. Enl.

Turdus formicivorus, Gm. S. N. i. p. 828.

Myrmothera formicivora, Vieill. Enc. Méth. p. 782.

Myioturdus palikour, Mén. Mon. Myioth. p. 470.

Formicarius torquatus, Gray, Gen. i. p. 211.

Rhopoterpe formicivora, Cab. Orn. Not. p. 228; Bp. Conspectus p. 200.

♂. *Cinnamomeo-brunnea, dorso nigro maculato; alis nigris pallido cinnamomeo trifusciatis: subtus cinerea, gutture et pectore antico nigris; ventre medio nigro transversim radiato.*

♀. *Gutturæ et pectore antico ferrugineis.*

Long. tota 5·5, alæ 3·7, caudæ 1·4, rostri a recto 1·05, tarsi 0·9.

Hab. Cayenne.

Mus. Brit., P. L. S.

Genus V. PHLOGOPSIS.

Phlegopsis, Reich. Nat. Syst. d. Vög. pl. 57. (1850).

Rostrum forte, compressiusculum, naribus parvis, rotundatis, antice positis; regione oculari nuda; narium plumis erectis et setosis: pedes modici; acrotarsiis viz conspicue divis; paratarsiis integris, ungue postico brevi, incurvato.

This section is at once distinguished from *Formicarius* by the forward position of the small, rounded nostrils and nudity of the ocular region, which in *Formicarius* is densely feathered. The hind claw is also remarkably short and thick.

1. PHLOGOPSIS NIGRO-MACULATA.

Myiothera nigro-maculata, Lafr. et D'Orb. Syn. Av. in Mag. de Zool. 1837, p. 14; D'Orb. Voy. p. 190. pl. 6*. fig. 2.

Formicarius nigro-maculatus, Gray, Gen. i. p. 211; Sclater, P.Z.S. 1858, p. 68.

Brunnescenti-olivacea, capite toto cum gula et pectore nigris: primariis extus cum cauda rufis; interscapulio, tectricibus alarum et secundariis dorso proximis maculis ovalibus nigris ornatis.

Long. tota 6·5, alæ 3·3, caudæ 2·3.

Hab. Bolivia, Chiquitos (D'Orb.); Upper Amazon; Ecuador, Rio Napo; River Ucayali (Hauzwell).

Mus. Brit., P. L. S.

2. PHLOGOPSIS ERYTHROPTERA.

Formicarius erythropterus, Gould, Ann. N. H. ser. 2. xv. p. 345, et P. Z. S. 1855, p. 69.

Nigra, dorsi postici plumarum marginibus anguste albis: fascia tectricum alarum mediarum apicali et primariis extus castaneis.

Long. tota 6·5, alæ 3·7, caudæ 2·5.

Hab. South America.

Mus. Brit.

Genus VI. FORMICARIUS.

Formicarius, Bodd. Table d. Pl. Enl. (1783).

Myrmornis, Herm. Tab. Aff. Animal. (1783).

Myrmecophaga, Lacép. Mém. Inst. (1800-1).

Myiothera, Ill. Prod. Syst. M. et Av. (1811).

Myrmothera, Vieill. Analyse, p. 43 (1816).

Myiocrincla, Swains. Class. ii. 230 (1837).

Rostrum crassiusculum: regio ocularis plumis vestita: alæ longiores, remigibus tertio quarto et quinto æqualibus et longissimis: tarsi modice longi, validiusculi; scutis divis; ungue postico elongato, gracili.

1. FORMICARIUS CAYANENSIS.

Le tetema de Cayenne, Buff. Pl. Enl. 821.

Formicarius cayanensis, Bodd. Table des Pl. Enl. ; Gray, Gen. i. p. 211.

Turdus colma, var. β , Gm. S. N. 827.

Le colma de Cayenne, Buff. Pl. Enl. 703, fig. 1.

Turdus colma, Gm. S. N. 827, et auct.

Myiothera tetema, Burm. Syst. Ueb. iii. 46 ; Bp. Consp. p. 205.

Myioturdus tetema, Max, Beitr. iii. 1038 ; Ménétr. Mon. Myioth. p. 466.

Myrmothera fuscicapilla, Vieill. Nouv. Dict. xii. p. 112 ; Enc. Méth. p. 681.

Myiothera ruficeps, Spix, Av. Bras. i. p. 72. pl. 72. fig. 1.

Myrmothera tetema, Vieill. Enc. Méth. p. 683.

Myrmothera colma, Vieill. ibid. p. 682.

Myiothera colma, Schomb. Guian. iii. p. 686 ; et Bp. Consp. p. 205.

Rufous-naped Thrush, Lath. G. H. v. p. 167.

Olivaceo-brunneus ; loris et gutture nigricantibus ; fronte pileoque castaneis.

Long. tota 6·5, alæ 3·5, caudæ 2·0.

Hab. Cayenne ; Brit. Guiana ; North and South-eastern Brazil.

Mus. Brit., P. L. S.

The '*colma*' is the young of this species, the '*tetema*' the adult. I have seen intermediate stages.

2. FORMICARIUS NIGRIFRONS.

Formicarius nigrifrons, Gould, Ann. N. H. ser. 2. xv. p. 344 ; et P. Z. S. 1855, p. 69.

Præcedenti simillimus, sed fronte nigra.

Long. tota 6·5, alæ 3·5, caudæ 2·0.

Hab. New Granada ; Eastern Peru, Chamicurros (*Hauzwell*).

Mus. Brit., P. L. S.

I am far from being satisfied as to the real distinctness of this species.

3. FORMICARIUS ANALIS.

Myiothera analis, D'Orb. & Lafr. Mag. de Zool. 1837, p. 14 ; D'Orb. Voy. Amér. Mér. p. 191, pl. 6. fig. 1 ; Schomb. Guian. iii. p. 686 ; Bp. Consp. p. 205.

Formicarius analis, Gray, Gen. i. p. 211.

Rufous-naped Thrush, var. B, Lath. G. H. v. p. 168.

Rufescenti-olivaceus, subtilus magis grisescens, gutture nigricantior ; crisso vivide rufo.

Long. tota 6·8, alæ 3·6, caudæ 2·2.

Hab. Bolivia (*D'Orb.*) ; River Amazon, Para (*Wallace*) ; Cayenne ; Trinidad ; Brit. Guiana, Roraima Mountains (*Schomb.*).

Mus. Brit., P. L. S.

4. FORMICARIUS MONILIGER.

Formicarius moniliger, Sclater, P. Z. S. 1856, p. 294.

Brunnescenti-olivaceus, pileo nigricantiore; macula in loris alba; gutture nigro, infra rufo cincto; abdomine nigricanti-griseo, lateraliter olivascens.

Long. tota 6·5, alæ 3·5, caudæ 2·2.

Hab. Southern Mexico, prov. Vera Cruz (Sallé); Mosquito coast (Bell).

Mus. Brit. et Paris.

5. FORMICARIUS TRIVITTATUS.

Formicarius trivittatus, Sclater, P. Z. S. 1857, p. 46.

Supra flavo-cinnamomeus, subtus clarior, gula pallidior; alis caudaque nigris cinnamomeo tinctis, illis albo trifasciatis.

Long. tota 7·0, alæ 3·4, caudæ 2·5.

Hab. Upper Amazon.

Mus. Brit.

Genus VII. CHAMÆZA.

Chamæza, Vig. 1825; Zool. Journ. ii. p. 395 (1826).

Chamæzosa, Cab. Orn. Not. 1847, p. 204.

Rostrum brevius quam caput, compressum: alæ brevissimæ, remigibus tertio quarto et quinto æqualibus, secundarias vix excedentibus: tarsi modicæ longitudinis, acrotarsiis et paratarstiis divisus; ungue postico brevi, valido: cauda modica parum rotundata.

1. CHAMÆZA BREVICAUDA.

Turdus brevicaudus, Vieill. Nouv. Dict. xx. p. 249; Enc. Méth. p. 645.

Myiothera campanisona, Licht. Doubl. p. 43 (1823).

Chamæza meruloides, Vigors, Zool. Journ. ii. p. 395 (1826); Jard. Selby, Ill. Orn. i. pl. 11.

Myioturdus marginatus, Max, Beitr. iii. 1035 (1831); Ménétr. Mon. Myioth. p. 465, pl. 1.

Grallaria marginata, Gray, Gen. i. p. 213.

Chamæzosa brevicauda, Cab. Orn. Not. p. 218.

Grallaria brevicauda, Lafr. R. Z. 1842, p. 334.

Chamæzosa marginata, Burm. Syst. Ueb. iii. p. 47.

"*Myiothera strigilata*, Cuv."; Puch. Arch. d. Mus. vii. p. 335.

Cinnamomeo-brunnea, pileo rufescentiore: subtus pallide ochracea, gutture toto et ventre medio albis; plumis pectoris et ventris laterum nigro late marginatis et punctatis; caudæ apice albo, fascia subapicali nigra.

Long. tota 7·75, alæ 3·4, caudæ 3·0, tarsi 1·4.

Hab. South-eastern Brazil, Bahia.

Mus. P. L. S., Brit.

2. CHAMÆZA OLIVACEA.

Chamæza olivacea, Tsch. Consp. Av. in Wiegman. Arch. 1847, p. 279; Tsch. F. P. p. 178.

Grallaria olivacea, Gray, Gen. i. p. 213.

Chamæzosa olivacea, Cab. Orn. Not. p. 218.

Similis speciei præcedenti, sed pileo dorso concolore, colore subtus magis albo et plumarum marginibus multo latioribus; cauda brevior.

Long. tota 7·5, alæ 3·6, caudæ 2·5, tarsi 1·4.

Hab. Eastern Peru; New Granada, Bogota; Venezuela, Caraccas.

I have seen Tschudi's type of *Chamæza olivacea*, which is but slightly different from *C. brevicauda*. The characters above are taken from a Venezuelan specimen in my own collection, which I think is probably the same as Tschudi's bird.

3. CHAMÆZA NOBILIS.

Chamæza nobilis, Gould, Ann. N. H. ser. 2. xv. p. 344; P. Z. S. 1855, p. 68.

Supra cinnamomeo-brunnea: subtus alba; pectoris, ventris et laterum plumis utrinque nigro marginatis, tanquam squamatis; gutture et abdomine medio albis; caudæ apice albo, vitta subapicali nigra.

Long. tota 9·0, alæ 4·3, caudæ 2·5, tarsi 1·5.

Hab. Eastern Peru, Chamicurros on the Huallaga (*Hauzweller*); S. Maria on the Ucayali (*Cast. et Dev.*).

Mus. Brit., Paris.

4. CHAMÆZA MOLLISSIMA.

Chamæza mollissima, Sclater, P. Z. S. 1855, p. 89, pl. 96 et p. 145; List Bog. B. p. 17.

Supra brunneo-castanea, remigibus rectricibusque intus nigris; capitis lateribus et corpore toto subtus nigris, albo confertim transvittatis.

Long. tota 5·75, alæ 3·2, caudæ 2·5.

Hab. New Granada, Bogota.

Mus. Brit., Paris.

Genus VIII. GRALLARIA.

Grallaria, Vieill. 1816; Analyse, p. 43 (1816).

Myioturdus, Boié, Isis, 1826.

Myiotrichas, Boié, Isis, 1831.

Colobathris, Cab. Orn. Not. p. 216 (1847).

Hypsibemon, Cab. Orn. Not. p. 217 (1847).

Rostrum validum, modice elongatum, compressum, culmine multum incurvo: alæ breves, remigibus quarto quinto et sexto longissimis

et tertium superantibus : tarsi longissimi, acrotarsiis divisis, paratarsiis plerumque integris.

1. GRALLARIA VARIA.

Le roi des Fourmilliers de Cayenne, Pl. Enl. 702.

Formicarius varius, Bodd. Table d. Pl. Enl.

Turdus rex, Gm. S. N. i. p. 828, et auct.

Turdus grallarius, Lath. Ind. Orn. i. p. 361.

Grallaria fusca, Vieill. Gal. Ois. pl. 154 ; Tsch. Faun. Per. p. 181.

Myioturdus rex, Ménétr. Mon. Myioth. p. 462.

Grallaria varia, Gray, Gen. i. p. 213.

Colobathris rex, Cab. Orn. Not. p. 217.

Grallaria rex, Lafr. R. Z. 1842, p. 333 ; Bp. Consp. p. 204.

Olivacea, pileo plumbescente, plumis omnibus nigro marginatis : loris et striga rictali utrinque albis : regione auriculari et gula nigricantibus : macula cervicali media alba : abdomine cinnamomescenti-albido, plumarum parte mediali alba, nigro marginata ; tectricibus subalaribus pallide cinnamomeis.

Long. tota 7·0, alæ 4·6, caudæ 1·7, tarsi 1·8.

Hab. Cayenne (*Buff.*) ; Para ; Eastern Peru (*Tsch.*).

Mus. Brit.

2. GRALLARIA IMPERATOR.

Myioturdus rex, Max, Beitr. iii. 1027.

Myiothera grallaria, Licht. Verz. d. Doubl. p. 43.

Grallaria imperator, Lafr. R. Z. 1842, p. 333 ; Gray, Gen. i. p. 213.

Grallaria rex, Burm. Syst. Ueb. iii. p. 50.

Similis speciei præcedenti sed abdomine fasciis obsoletis nigris omnino transversim radiato ; maculis in scapis plumarum nullis.

Long. tota 7·5, alæ 4·6, caudæ 1·7, tarsi 1·9.

Hab. South-eastern Brazil ; S. Paolo (*Licht.*).

Mus. Brit., P. L. S.

3. GRALLARIA GUATIMALENSIS.

Grallaria guatimalensis, Prev. Voy. d. l. Venus, Ois. t. 2 ; Sclater, P. Z. S. 1856, p. 294 ; Gray, Gen. i. p. 213.

Olivacea, plumis late nigro marginatis ; pileo cinereo : loris albis : alis extus rufescentibus : cauda rufa : subtus saturate ferruginea, macula in collo medio alba.

Long. tota 6·8, alæ 4·5, caudæ 1·7, tarsi 2·05.

Hab. Guatemala ; S. Mexico, Cordova (*Sallé*).

Mus. Brit., Derb.

4. GRALLARIA SQUAMIGERA.

Grallaria squamigera, Prevost, Voy. Venus, Ois. t. 1 ; Lafr. R. Z. 1842, p. 333 ; Bp. Consp. p. 204 ; Gray, Gen. i. p. 213 ; Sclater, P. Z. S. 1855, p. 145 ; List Bog. B. p. 17.

Obscure plumbea, subtus fulva, vittis et punctis nigris omnino transfasciata, ventre imo et gula media immaculatis.

Long. tota 8·5, alæ 6·0, caudæ 2·0, rostri a rectu 1·4, tarsi 2·4.

Hab. New Granada, Bogota.

Mus. Brit., P. L. S.

5. GRALLARIA HYPOLEUCA.

Grallaria hypoleuca, Sclater, P. Z. S. 1855, p. 88, et 1856, p. 145 ; List Bog. B. p. 17.

Supra ferruginea, loris albidis : subtus alba, lateribus magis cinerascens ; tibiis et hypochondriis brunnescentibus.

Long. tota 6·5, alæ 3·5, caudæ 1·8.

Hab. New Granada, Bogota.

Mus. Paris.

6. GRALLARIA MODESTA.

Grallaria modesta, Sclater, P. Z. S. 1855, p. 89. pl. 94, et 1856, p. 145 ; List Bog. B. p. 17.

Supra intense brunnescenti-olivacea, alis caudaque nigricanti-brunneis olivaceo tinctis : subtus olivacea, flavescens-albido, nisi in ventre medio, flammulata ; tectricibus subalaribus pallide castaneis.

Long. tota 6·2, alæ 3·2, caudæ 1·8, tarsi 1·75.

Hab. New Granada, Bogota.

Mus. Brit.

7. GRALLARIA MONTICOLA.

Grallaria monticola, Lafr. R. Z. 1847, p. 68 ; DesMurs, Icon. Orn. pl. 53 ; Gray, Gen. i. p. 213.

Chamaea monticola, Bp. Consp. p. 204.

Grallaria quitensis, Less. Echo d. M. S. ?

Olivaceo-brunnea, subtus fulvescenti-albida ; loris, gutture et ventre medio albescentibus.

Long. tota 6·4, alæ 3·9, caudæ 2·0, rostri a rectu 1·15, tarsi 2·0.

Hab. New Granada, Pasto (*Lafr.*) ; Bogota ; vicinity of Quito (*Jameson*).

Mus. Brit., Paris., P. L. S.

8. GRALLARIA BREVICAUDA.

Le grand befroi, Buff. Pl. Enl. 706. fig. 1.

Formicarius brevicauda, Bodd. Table d. Pl. Enl.

Turdus tinniens, Gm. S. N. i. p. 827.

Grallaria tinniens, Bp. Consp. p. 204 ; Burm. Syst. Ueb. iii. p. 51 ; Lafr. R. Z. 1842, p. 334 ; Tsch. Faun. Per. p. 182.

Grallaria brevicauda, Gray, Gen. i. p. 213.

Colobathris tinniens, Cab. Orn. Not. p. 217.

Myioturdus tinniens, Mén. Mon. Myioth. p. 469.

Cinnamomeo-brunnea, subtus alba, pallide grisescenti-olivaceo flam-

mulata, gula et ventre medio puris, immaculatis: tectricibus subalaribus pallide rufis.

Long. tota 5·0, alæ 3·3, caudæ 1·3, tarsi 1·8.

Hab. Cayenne; Ecuador, Rio Napo.

Mus. Brit., P. L. S.

9. GRALLARIA MACULARIA.

Pitta macularia, Temm. in Pl. Col. sed fig. nulla.

Colobathris macularia, Cab. Orn. Not. p. 217; Schomb. Guian.

iii. p. 685.

Grallaria macularia, Lafr. R. Z. 1842, p. 334; Burm. Syst. Ueb.

iii. p. 50; Gray's Gen. i. p. 213; Bp. Consp. p. 204.

Olivaceo-brunnea, alis extus rufo variis, remigibus extus rufis: subtus alba, pectore confertim nigro maculato, lateribus ochraceis: regione oculari nudiuscula: ungue postico brevi et valido.

Long. tota 5·4, alæ 3·4, caudæ 1·3, tarsi 1·4.

Hab. British Guiana (Schomb.).

Mus. Derbiano.

10. GRALLARIA OCHROLEUCA.

Myioturdus ochroleucus, Max, Beitr. iii. p. 1032; Ménétr. Mon. p. 464.

Similis speciei precedenti, sed rostro multo angustiore et compresso; maculis externis tectricum nullis: maculis solum in lateribus pectoris et ventris et his minoribus et rotundis: ungue postico gracili, elongato; oculorum ambitu vestito.

Long. tota 5·5, alæ 3·0, caudæ 1·5, tarsi 1·4.

Hab. South-eastern Brazil, prov. Bahia (Max).

Mus. Lugd.

The above are my notes taken from a specimen in the Leyden Museum, which is labelled "*Myiot. marginatus*." This is certainly an error; and I think in all probability the bird is referable to this species.

11. GRALLARIA FULVIVENTRIS.

Grallaria fulviventris, Sclater, P. Z. S. 1858, p. 68.

Olivaceo-brunnea, pileo obscuriore, alis extus magis rufescentibus, loribus albidis: subtus gula et abdomine medio albis, pectore, ventris lateribus et crisso cum tectricibus alarum inferioribus saturate fulvis, pectore lineis quibusdam nigris variegato: rostro superiore nigro, inferiore, nisi apice, flavo: pedibus pallide brunneis.

Long. tota 5·5, alæ 3·2, caudæ 1·4, tarsi 1·5, rostri a rectu 0·95.

Hab. Eastern Ecuador, Rio Napo.

Mus. P. L. S.

12. GRALLARIA RUFICAPILLA.

Grallaria ruficapilla, Lafr. R. Z. 1842, p. 333; Gray's Gen. i.

p. 217; Sclater, P. Z. S. 1855, p. 145, et List Bog. B. p. 17.

Hypsibemon ruficapillus, Cab. Orn. Not. p. 217; Bp. Consp. p. 204.

Olivaceo-brunnea, pileo toto et capitis lateribus castaneo-rufis : subtus alba, pectoris et laterum plumis utrinque nigro-brunneo marginatis, quasi striatis ; tectricibus subalaribus pallide rufis.

Long. tota 8·0, alæ 4·0, caudæ 2·0, tarsi 1·9.

Hab. New Granada, Bogota ; Ecuador, vicinity of Quito (Jameson).

Mus. Brit., P. L. S.

13. GRALLARIA RUFULA.

Grallaria rufula, Lafr. R. Z. 1843, p. 99 ; Gray, Gen. i. p. 213 ; Sclater, P. Z. S. 1855, p. 145 ; List Bog. B. p. 17.

Hypsibemon rufulus, Cab. Orn. Not. p. 218 ; Bp. Consp. p. 204.

Castaneo-rufa, subtus dilutior : ventre medio flavicanti-albido.

Long. tota 4·75, alæ 2·9, caudæ 1·5, tarsi 1·7.

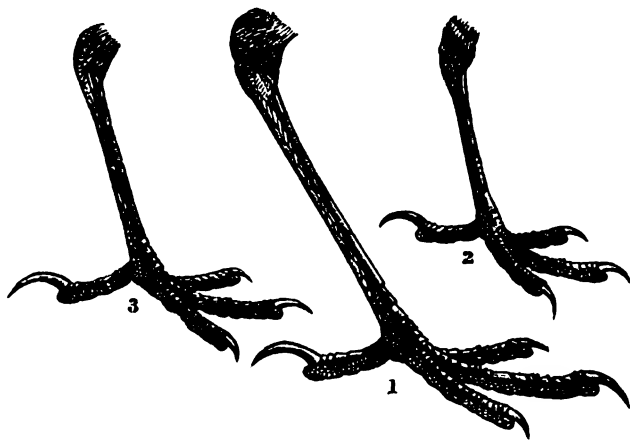
Hab. New Granada, Bogota.

Mus. Brit., P. L. S.

Genus IX. GRALLARICULA.

Rostrum breve, basi dilatata, rictu parum setoso : alæ breves rotundatæ : cauda brevis : pedes debiles : tarsi graciles, breviusculi ; acrotarsiis divis, paratarsiis integris, unguibus brevibus.

These birds are diminutive *Grallariæ*, but distinguished by their shorter, feeble bill, the indications of rictal bristles, and short slender tarsi and toes. They appear to form a transition between *Grallaria* and *Conopophaga*. The woodcut represents (fig. 2) the tarsus of *Grallaricula flavirostris*, which may be contrasted with that of *Conopophaga lineata* (fig. 3) and *Grallaria rufula* (fig. 1).



1. GRALLARICULA FLAVIROSTRIS.

Grallaria flavirostris, Sclater, P. Z. S. 1858, p. 68.

Brunnescenti-olivacea, loris et capitis lateribus rufescentibus : subtus alba, pectoris medii et lateralis plumis pallide rufis, utrinque

nigro late limbatis, quasi squamatis; gulæ lateribus rufo tinctis, fascia nigricante intus marginatis; tectricibus subalaribus pallide rufis; rostro flavo; pedibus clare brunneis.

Long. tota 4·2, alæ 2·7, caudæ 1·1, tarsi 0·9, rostri a rictu 0·7.

Hab. Ecuador, Rio Napo; New Granada, Bogota.

Mus. Brit., P. L. S.

2. GRALLARICULA LORICATA.

Grallaria loricata, Sclater, P. Z. S. 1857, p. 129.

Supra olivacea: pileo castaneo: oculorum ambitu, loris et gula tota albidis, fulvo tinctis: stria duplici gutturis utrinque nigra: pectoris et ventris lateralis plumis omnibus medialiter fulvo-albidis, undique late nigro marginatis: ventre medio et crisso albis, hypochondriis brunnescens: rostro clare brunneo, basi flavida: tectricibus subalaribus pallide brunneis.

Long. tota 4·0, alæ 2·8, caudæ 0·8, tarsi 1·6.

Hab. Venezuela, Caraccas (*Levraud*).

Mus. Paris.

3. GRALLARICULA FERRUGINEIPECTUS.

Grallaria ferrugineipectus, Sclater, P. Z. S. 1857, p. 129.

Supra pallide brunnea, olivaceo induta: loris et regione oculari et auriculari fulvo tinctis: subtus flavicanti-ferruginea, collo antico medialiter et ventre toto cum crisso albis: alis nigricantibus pallido brunneo limbatis, tectricibus alarum superioribus omnino nigricantibus, inferioribus autem cum campterio ochraceis: rostri nigri basi flavicante: pedibus pallidis.

Long. tota 3·8, alæ 2·6, caudæ 1·2, tarsi 1·85.

Hab. Venezuela, Caraccas (*Levraud*).

Mus. Paris.

4. GRALLARICULA NANA.

Grallaria nana, Lafr. R. Z. 1842, p. 334; Gray's Gen. i. p. 213.

Chamaea nana, Bp. Consp. p. 204.

Conopophaga nana, Sclater, P. Z. S. 1855, p. 145; List Bog. B. p. 17.

Brunneo-olivacea, pileo schistaceo, loris et corpore subtus intense ferrugineis, abdomine medio albicante.

Long. tota 4·0, alæ 2·7, caudæ 1·5, tarsi 1·1.

Hab. New Granada, Bogota.

Mus. Brit.

Genus X. CONOPOPHAGA.

Conopophaga, Vieill. Analyse, p. 39 (1816).

Myiagrus, Boié, Isis, 1826.

Rostrum breve, tumidum, latum, rotundatum: alæ subbreves, remige tertio quartum quintum sextum et septimum æquales et longissimos subæquante: tarsi longi, acrotarsiis vis conspicue divis, paratarsiis integris, ungue postico subbrevis et multum arcuato.

a. *Fasciculo postoculari elongato.*

1. CONOPOPHAGA AURITA.

Turdus auritus, Gm. S. N. p. 827.

Pipra leucotis, Gm. S. N. p. 1003.

Fourmillier à oreilles blanches, Buff. Pl. Enl. 822.

Conopophaga leucotis, Vieill. Gal. Ois. pl. 127; Ménétr. Mon. Myioth. p. 532.

Conopophaga aurita, Gray, Gen. i. p. 255; Bp. Consp. p. 203; Burm. Syst. Ueb. iii. p. 52.

Supra olivaceo-brunnea, pileo rufo; fronte, capitis lateribus, et gula nigris; plumarum fasciculo elongato post-oculari albo; pectore castaneo, ventre medio albescente, lateribus olivaceo-brunneis.

Long. tota 4·0, alæ 2·5, caudæ 1·3, tarsi 1·05.

Hab. Cayenne (Buff.).

Mus. P. L. S.

2. CONOPOPHAGA MELANOASTRA.

Conopophaga melanogaster, Mén. Mon. Myioth. p. 537. pl. 15. fig. 2; Burm. Syst. Ueb. iii. p. 53; Bp. Consp. p. 203.

Castanea, fasciculo postoculari albo: capite et corpore subtus nigerrimis: crisso grisescenti-ferrugineo.

Hab. Interior of Brazil, Cuyaba (Langsdorf).

Mus. Petropolitano! (Non vidi.)

3. CONOPOPHAGA LINEATA.

Myiagrus lineatus, Max, Beitr. iii. p. 1046 (1831).

Conopophaga vulgaris, Ménétr. Mon. Myioth. p. 534. pl. 14. fig. 1 (1832).

Conopophaga lineata, Gray, Gen. i. p. 255; Cab. Orn. Not. p. 215; Bp. Consp. p. 203; Burm. Syst. Ueb. iii. p. 52.

♂. *Supra olivaceo-brunnea, subtus ferruginea, gula et ventre medio albescentibus; plumarum fasciculo elongato postoculari albo.*

♀. *Mari similis, sed coloribus dilutioribus.*

Long. tota 5·0, alæ 2·8, caudæ 1·7, tarsi 1·1.

Hab. South-eastern Brazil.

Mus. Brit., P. L. S.

4. CONOPOPHAGA TORRIDA.

Conopophaga torrida, Selater, P. Z. S. 1858, p. 68.

Clare brunnescenti-olivacea, dorsi plumis nigro partim variegatis; capite supra, alis et cauda ferruginescenti-brunneis; tectricibus alarum et secundariis extus macula apicali fulvo-flavida ornatis; plumarum fasciculo postoculari albo; subtus clare ferruginea, gula et ventre medio albicantibus, hypochondriis et ventre imo magis fulvis.

Long. tota 4·6, alæ 2·8, caudæ 1·2, tarsi 1·0.

Hab. Ecuador, Rio Napo; Chamicurros (Haurowell).

Mus. Brit., P. L. S.

5. CONOPOPHAGA CASTANEICEPS.

Conopophaga ardesiaca, Tsch. Faun. Per. p. 179; Sclater, P. Z. S. 1855, p. 145.

Conopophaga castaneiceps, Sclater, P. Z. S. 1857, p. 47.

Supra brunnescenti-olivacea, pileo castaneo, frontem versus latiore : capitis lateribus et gula nigricanti-cinereis plumarum penicilla postoculari alba : subtus cinerea, abdomine medio albescentiore, lateribus olivaceo indutis : rostro superiore nigro, inferiore flavo : pedibus brunneis.

Long. tota 4·4, alæ 2·9, caudæ 2·7.

Hab. New Granada, Bogota; Eastern Peru (Tsch.).

Mus. Brit., P. L. S.

6. CONOPOPHAGA PERUVIANA.

Conopophaga peruviana, DesMurs, Voy. Casteln. Ois. p. 50. pl. 16. fig. 1.

Olivaceo-brunnea, dorsi pennis nigro marginatis ; tectricum alarum apicibus clare fulvis ; pileo castaneo, penicilla postoculari alba : subtus plumbea, gutture medio et ventre medio albescentibus ; hypochondriis et crisso rufescentibus.

Long. tota 4·5, alæ 2·5, caudæ 1·3, tarsi 1·0.

Hab. Upper Amazon, Pebas and Nauta (Cast. et Dev.); Ecuador, Rio Napo.

Mus. Paris., P. L. S.

I think that this is an immature bird, perhaps the young of *C. ardesiaca*.

7. CONOPOPHAGA ARDESIACA.

Conopophaga ardesiaca, D'Orb. & Lafr. Syn. Av. in Mag. de Zool. 1837; D'Orb. Voy. p. 188.

Fusco-olivacea, fronte et corpore subtus ardesiaceis, penicilla postoculari alba : abdomine medio albicante, hypochondriis parum olivascentibus.

Long. tota 5·0, alæ 2·8, caudæ 1·8, tarsi 1·2.

Distinguishable from *C. castaneiceps* by the cinereous front, and by the head being of the same brown olive as the back.

Hab. Bolivia (D'Orb.).

Mus. Paris., P. L. S.

b. *Fasciculo postoculari nullo.*

8. CONOPOPHAGA MELANOPS.

Platyrhynchus melanops, Vieill. Dict. d'H. N. xxvii. p. 14; Enc. Méth. p. 837; Puch. Arch. Mus. Par. vii. p. 359.

Myiothera perspicillata, Licht. Doubl. p. 43.

Myioturdus perspicillatus, Max, Beitr. iii. p. 1042.

Conopophaga perspicillata, Cab. Orn. Not. p. 215; Bp. Consp. p. 203; Burm. Syst. Ueb. iii. p. 54.

Conopophaga nigrogenys, Less. Trait. d'Orn. i. p. ; Ménétr. Mon. Myioth. p. 536. pl. 15. fig. 1.

Conopophaga ruficeps, ♂, Sw. Orn. Draw. pl. 67 (♂), 68 (♀); Nat. Lib. x. pl. 52.

Conopophaga dorsalis, Ménétr. Mon. Myioth. p. 533. pl. 14. fig. 2 (♀); Bp. Consp. p. 203; Burm. Syst. Ueb. iii. p. 53.

♂. *Olivaceo-brunnea, dorsi medii plumis nigro marginatis; pileo castaneo; capitis lateribus nigris: subtus plumbea, gula et ventre medio albis.*

♀. *Olivaceo-brunnea, dorsi medii plumis nigro marginatis; pileo brunnescenti-castaneo; tectricum apicibus pallide fulvis: subtus clare brunnea, gutture et ventre medio albidioribus.*

Long. tota 4·5, alæ 2·5, caudæ 1·3, tarsi 1·0.

Hab. South-eastern Brazil, prov. Rio (Ménétriés, Burm., Max).

I believe Ménétriés and Burmeister are in error in considering *C. melanops* and *C. dorsalis* as specifically different. Prince Max (who found them breeding) describes them very clearly as being different sexes of the same bird; and such would be the obvious deduction from an examination of specimens.

10. CONOPOPHAGA CUCULLATA.

Conopophaga cucullata, Sclater, P. Z. S. 1855, p. 29. pl. 119.

Brunnescenti-olivacea, capite toto cum gula castaneis; plaga cervicali antica alba; abdomine dilute cinereo; rostro albo-flavo.

Long. tota 4·0, alæ 2·7, caudæ 1·1.

Hab. New Granada, Bogota.

Mus. P. L. S.

Genus XI. CORYTHOPIS.

Corythopis, Sundeval, Vet. Acad. Handl. 1835, p. 93.

Rostrum debilius, elongatum: alæ sublongæ; remige primo secundarios, secundo sextum subæquante; tertio quarto et quinto longissimis: cauda sublonga, parum rotundata: tarsi sublongi, acrotarsiis integris aut extus obsolete divisus; paratarsiis integris; ungue postico gracili, elongato.

1. CORYTHOPIS CALCARATA.

Myiothera calcarata, Max, Beitr. iii. p. 1101.

Muscicapa delalandii, Less. Tr. d'Orn. i. p. 392.

Corythopis calcarata, Cab. Orn. Not. p. 215; Bp. Consp. p. 203; Burm. Syst. Ueb. iii. p. 58.

Viridescenti-olivacea, subtus alba: torque lata pectorali e maculis magnis confluentibus nigra.

Long. tota 5·0, alæ 2·6, caudæ 2·0, tarsi 0·9.

Hab. South-eastern Brazil (Max).

Mus. Brit., Paris.

2. CORYTHOPIS ANTHOIDES.

Muscicapa anthoides, Cuv. in Mus. Paris. ; Puch. Arch. Mus. vii. 334.

Brunnescenti-olivacea, subtus alba; torque lata pectorali e maculis magnis confluentibus nigra.

Long. tota 4·5, alæ 2·5, caudæ 2·0, tarsi 0·9.

Hab. Cayenne.

Mus. Paris., P. L. S.

Distinguishable from the Brazilian bird by the different tint of the back, which is olive-brown, not green. I have not yet seen the Bolivian bird (*C. nigrincincta*, D'Orb.) nor the Peruvian (*C. torquata*, Tsch.), and cannot say whether they are different or not.

List of species not recognized.

1. *Myrmothera unicolor*, Ménétr. Mon. p. 480. pl. 2. fig. 1, ex Brasilia.

2. *Myiothera ardesiaca*, Max, Beitr. iii. 1055, ex Brasilia.

3. *Formicivora atra*, Tsch. F. P. p. 145 (*Pyriglena picea*, Cab.), ex Peruvia.

4. *Lanius funebris*, Licht. Doubl. p. 47 (*Pyriglena funebris*, Cab.), ex Cayenna.

5. *Myrmonax lugubris*, Cab. Orn. Not. p. 211, ex Guiana.

6. *Thamnophilus axillaris*, Tsch. F. P. p. 174 (*Herpsilochmus axillaris*, Cab.), ex Peruvia.

7. *Thamnophilus jani*, De Filippi, Cat. Mus. Mediol. p. 32.

8. *Thamnophilus affinis*, Lafr. et D'Orb. Mag. de Zool. 1837, p. 12, ex Boliv.

9. *Thamnophilus olivaceus*, Tsch. F. P. p. 174, ex Peruvia.

10. *Thamnophilus griseus*, Spix, Av. Bras. ii. pl. 41. f. 1, ex fl. Amaz.

11. *Ramphocænus trinitatis*, Less. Rev. Zool. 1839, p. 42.—Lesson's *R. viridis* is a Madagascar bird, the type of Prince Bonaparte's genus *Bernieria* (see Pucheran, Types, Arch. de Mus. vii. p. 369).

12. *Myrmothera melanoleucus*, Vieill. Nouv. Dict. xii. p. 113, et Enc. Méth. p. 682, ex Guiana.

13. *Myrm. vittata*, Vieill. Nouv. Dict. xii. 114, et Enc. Méth. p. 683, ex Guiana.—Referred by Mr. Gray to *Psilorhamphus maculatus*.

14. *Myrm. rufa*, Vieill. l. c., ex Guiana.

15. *Myrm. leucophrys*, Vieill. l. c., ex Guiana.

16. *Myrm. atricapilla*, Vieill. Nouv. Dict. xii. p. 115, et Enc. Méth. p. 683, ex Cayenna.—This is perhaps *Cercomacra atrithorax*.

17. *Myrm. tessellata*, Vieill. Enc. Méth. p. 684, ex Cayenna.
18. *Myioturdus fuscater*, Lafr. Rev. Zool. 1845, p. 341, is said to be a *Malacocichla* (see P. Z. S. 1858, p. 64).
19. *Formicivora lafresnayana*, D'Orb. Voy. p. 182, pl. 6. fig. 1, ex Bolivia.
20. *Drymophila ruficauda*, Less. Rev. Zool. 1840, p. 226. Seems to be the same as *Myrmeciza ruficauda*.
21. *Formicivora guttata*, Less. l. c. p. 853, ex Brasil.
22. *Myiothera yarrelli*, Leadb. Trans. Linn. Soc. xvi. p. 87.

I do not think it necessary to repeat here the unrecognized synonyms of *Thamnophili*, which I have given at full length in my 'Draft Arrangement' of that genus, Edinb. Phil. Mag. n. s. vol. i.

2. ADDITIONAL NOTE ON THE UPLAND GOOSE (*CHLOEPHAGA MAGELLANICA*). BY PHILIP LUTLEY SCLATER.

In my note upon this bird in last year's 'Proceedings' (p. 128), I spoke somewhat doubtfully as to the brown bird figured by Buffon (Pl. Enl. 1006), and upon which Gmelin's term *magellanicus* was founded, being really the female of the white bird. The legs of the brown bird are yellow, and of the white bird black, a variation almost, I believe, without precedent in sexes of the same species. I had hoped that the question would have been settled by the pairing and breeding of these birds this spring; but this has not yet taken place, although the *Chloephaga poliocephala* has bred freely for several years. But the subjoined letter, which I have received in answer to an application for information made to Mr. James Hunt, the intelligent Head Keeper of the Gardens, seems to set this question of their being sexes of the same species quite at rest.

Zoological Gardens, Regent's Park,
April 27th, 1858.

SIR,

I beg leave to inform you that the person who reared the four Magellanic Geese presented to the Society by His Excellency Governor Moore, when in the Garden on the 5th of April last, stated that these birds were hatched about Oct. 1856, from eggs taken from the nest of the wild bird by Corporal Brown.

The eggs were set under a common hen, and four young ones were hatched from them, one of which died quite young; the other three are the three at present living in these Gardens. The fourth one that arrived with these three had one of its wings injured when it arrived here. This was a wild bird, taken when quite young; and the wing was injured in its capture.

He also stated that the black and white bird with the black legs is the male, and the two that are with it with the yellow legs are the females; that they are all hatched with black legs, and remain with the legs of that colour for some weeks after they are hatched;

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and that the first indication of sex is the change of colour of the legs from black to yellow, which change takes place earlier than the change of plumage in the young birds.

This person was in the service of Governor Moore for some time in the Falkland Islands.

I am, Sir,

P. L. Slater, Esq.,

&c. &c. &c.

Your most obedient servant,

JAMES HUNT.

I may remark, that these birds are well represented as sexes on the same plate in Mr. Cassin's account of the birds procured by the U. S. Naval Astronomical Expedition in Chili (see that work, pl. 24).

With regard to the "Ashy-headed Goose" which is figured in Gray and Mitchell's 'Genera of Birds' as *Bernicla inornata*, I am enabled to confirm what I before stated, that King's *Anas inornata* is not the same bird. Mr. G. R. Gray has shown me the type of King's description, which is now in the British Museum; and it is clearly not our "Ashy-headed Goose" of the Gardens, but perhaps hardly different from the true "*magellanica*." The Ashy-headed bird should therefore bear the name *poliocephala* given to it in the B.M. Catalogue published in 1844.

Mr Gould exhibited to the meeting a specimen of the American species *Regulus calendulus*, which was shot in a wood on Loch Lomondside by Dr. Dewar about five years since.

He also exhibited a specimen of the Night Heron, which had been shot at Combe Abbey, the seat of the Earl of Craven.

The following extract was read from a letter addressed to Mr. Gould by his son Mr. Charles Gould, dated Eastbourne, May 3, 1858:—

"In the course of my walk yesterday, I came close to a sand-pit rather suddenly; a number of Rabbits were playing about, who scampered off as soon as they became aware of the dread proximity of man, leaving behind them six or seven nondescript companions about their own size, sedately playful, awkward, and grotesque; at the distance at which I first saw them I was quite at a loss to imagine what they were. Finding they were curious rather than shy, I approached nearer, and found them to be young Fox Cubs; they allowed me to venture within about 15 yards of them, and then retired, without any indecorous haste, one by one into their holes."

June 8, 1858.

Dr. Gray, F.R.S., V.P., in the Chair.

The following papers were read :—

1. ON NEW SPECIES OF BIRDS FROM WESTERN AFRICA, IN THE COLLECTION OF THE BRITISH MUSEUM. BY DR. GUSTAV HARTLAUB OF BREMEN, FOREIGN MEMBER.

One of the principal reasons that made me anxious to visit England was the wish to increase my materials for a second edition of my book on the Birds of Western Africa. In this object I have been most liberally assisted by Mr. G. R. Gray, who has allowed me every opportunity of examining the specimens in the magnificent Collection of the British Museum. Besides some interesting novelties which we found, and which I wish to describe in the 'Proceedings' of the Society, among whose Foreign Members I have the honour to be enrolled, I have had the pleasure of inspecting some very rare species which I had not seen before. Among these I may mention some of those rare types collected during the second Niger Expedition by Mr. Louis Fraser,—as, for instance, the *Sylvicola superciliosa* of that naturalist, which from a second and more perfect Ashantee specimen I have found to be what I never expected, a typical *Camaroptera*; then the *Coccothraustes olivaceus* of Fraser, a type most peculiar and unique amongst the great number of African Fringillidæ. But by far the most interesting and most curious African form which I have seen for the first time, is a little bird hardly larger than the smallest Humming-bird, the *Dicaeum Rushiae* of Cassin, and the type of my genus *Pholidornis*. This minute and very peculiarly coloured species is the only true African representative of the essentially Asiatic form *Dicaeum*, from which, however, I hold it to be truly generically distinct.

The new species which I have observed, are the following :—

1. ONYCHOGNATHUS HARTLAUBII, G. R. Gray, MS.

Minor, obscure violascenti-chalybeus; capite toto et remigum minorum marginibus externis in æneum vergentibus; scapularibus, tectricibus alarum minoribus et subalaribus dorso concoloribus; rectricibus obscure chalybeis, margine ænescentibus; remigum nigrorum dimidio basali oblique rufo; rostro nigro; pedibus fuscis. ♀, capite et collo cinerascente striatis.

Long. tot. $10\frac{1}{2}$ ", rostr. a fr. $12\frac{1}{2}$ ", al. $4\frac{1}{2}$ ", rectric. intermed. $4\frac{1}{2}$ ", tars. $1\frac{1}{2}$ ".

Hab. Fernando Po.

This bird is a second and very typical species of my genus *Onychognathus*, the type of which, *O. fulgidus*, seems to be confined to the Island of St. Thomas. The system of colouring is quite the same in both species; but *O. hartlaubii* is a much smaller bird, and has the bill much less hooked. One of the two specimens in

the British Museum is labeled "Fernando Po;" the exact habitat of the other one is not known. *Onychognathus* is a beautiful transitional form, intermediate between *Amydrus* and *Lamprocolius*.

2. TELEPHONUS MINUTUS, sp. nov.

Minor; pileo toto nigro; striola superciliari gracili albida; cervice et interscapulio immaculate fulvis; dorso medio longitudinaliter nigro variegato; tergo et uropygio fulvis; loris albidis; alis rufis, remigibus primariis in pogonio interno nigriscanti-fuscis, tertiariis et tectricibus majoribus in medio longitudinaliter nigriscantibus; subalaribus fulvis; rectricibus fusco-nigris, duabus externis fulvescente extus limbatis, extimæ apice latius pallido; corpore inferiore toto fulvo, gula pallidiore; rostro valido nigro; pedibus fuscis.

Long. 7", rostr. a fr. $8\frac{1}{2}$ ", al. 2" 7", caud. 3". tars. $1\frac{1}{2}$ ".

Hab. Ashantee.

This is the smallest species of the exclusively African genus *Telephonus*. It is, perhaps, not generally known in this country, that the German traveller, Dr. A. Brehm, a very acute and scientific naturalist, who has explored the Ornithology of Spain better than any person before him, most decidedly contradicts the occurrence of *Telephonus cucullatus* or of any other species of this group in that country. Temminck's indication to the contrary appears to be one of those many errors occurring in Part 3 and 4 of the 'Manuel d'Ornithologie;' at least it was regarded as such by every person in Spain who had paid any attention to the birds of the country, and Dr. Brehm himself could not discover there the slightest trace of this bird.

Another striking and interesting example of the *incorrectness* of local indications in the 'Manuel d'Ornithologie,' is given in the total absence of the *Iros obscurus* from Spain or any other country in the south of Europe.

Two specimens of *T. minutus* are in the collection of the British Museum, which besides possesses a very complete set of all the other known species of the genus.

3. ANDROPADUS ERYTHROPTERUS, G. R. Gray, MS.

Obscure olivaceus, alis totis et imprimis tectricibus distincte rufescentibus; remigum marginibus internis pallidis; subalaribus flavidis; cauda fusca; corpore inferiore pallidiore, flavescente; rostro fusco, apice et mandibula tota flavidis; pedibus pallidis.

Long. tot. 6", rostr. $5\frac{1}{2}$ ", al. 2" 8", caud. 2" 9", tars. 8".

Hab. Ashantee.

Another bird of one of those exclusively African genera which seem to have their full development on the western coast. The other species are *A. importunus* from the Cape, *A. latirostris* and *A. gracilirostris*, both widely distributed along the western coast, and *A. virens* of Cassin, discovered by Du Chaillu on the banks of the river Muni and near Cape Lopez. The colouring of all these species is

very much alike; and clearer distinctive characters are much wanted in this group.

4. *TRICHOPHORUS CINERASCENS*, sp. nov.

Supra olivaceo-viridis, plumis medio cinerascens, capite distinctius cinerascens; genarum plumulis stria mediana pallida notata; tergo et uropygio viridioribus; remigum pogoniis externis virentibus, internis nigricantibus; rectricibus olivaceis, scapis nigris; subalaribus et subcaudalibus olivaceis: subtus olivaceo et cinerascens variegatus; gula flava; rostro plumbeo; pedibus nigricantibus.

Long. tot. $8\frac{1}{2}$ ", rostr. 9", al. 4", caud. 4", tars. $10\frac{1}{2}$ ".

Hab. Ashantee.

This fine new species comes nearest to *Tr. flavicollis* of Swainson, but is easily distinguished by the much greater amount of grey in its colouring. Nearly the whole of this group is distributed over the western parts of Africa. We know only one southern species. Not one has as yet been discovered in Abyssinia.

2. ON SOME NEW OR LITTLE-KNOWN SPECIES OF TANAGERS FROM THE COLLECTION OF M. VERREAUX OF PARIS. BY PHILIP LUTLEY SCLATER.

I have just received from M. Verreaux of Paris specimens of five *Tanagridæ*, part of a collection lately obtained from some district in the interior of Peru—I have little doubt, from the neighbourhood bordering on Bolivia, if not really within the limits of the latter republic. Two of them are certainly new species, and the others of rare occurrence; and I cannot avoid acknowledging my obligations to M. Jules Verreaux, our Corresponding Member, to whose friendliness I am indebted for having the opportunity of first examining these rare birds. The species are as follows:—

1. *BUARREMON RUFINUCHUS* (Lafr. et D'Orb.), Sclater, Syn. Av. Tan. p. 25, sp. 10.

Quite a distinct species from *B. latinuchus* of Ecuador, and readily known by its black back, and the black chin and sides of the throat. M. DuBus was perfectly right in separating them.

2. *CHLOROSPINGUS ALBITEMPORALIS* (Lafr.), Syn. Av. Tan. p. 27; P. Z. S. 1856, p. 89.

This specimen confirms my separation of this species from the Mexican *C. ophthalmicus*. I have already stated the grounds of difference.

3. *CHLOROSPINGUS CASTANEICOLLIS*, sp. nov.

Supra olivascens-fuscus, pileo saturatiore, alis caudaque rufescentioribus: capitis lateribus cum mento nigris, superciliis angustis ad nucham protractis et macula parva suboculari albis:

*subtus castaneus, pectore saturatiore, ventre medio dilutiore :
rostro nigro : pedibus brunneis.*

Long. tota 5·4, alæ 2·5, caudæ 2·3.

In colour this apparently new species of *Chlorospingus* shows most resemblance to *C. melanotis* (P. Z. S. 1854, pl. 68), and it may be conveniently arranged next to that species, and between it and *C. rubrirostris*, with which it nearly agrees in the shape of the bill. The dark chestnut colour of the breast, black chin, and white superciliary stripe render it easily recognizable amongst its congeners.

4. *CALLISTE CYANOTIS*, sp. nov.

*Metallice viridis, dorso summo obscuriore, pileo supero nigro ;
superciliis latis metallice viridibus : fronte ipsa cum loris nigris :
regione auriculari et vitta supra-frontali cærulescentibus ; alis
caudaque nigris cærulescenti-viridi limbatis : ventre imo cris-
sæ pallide ochraceis : rostro nigro, pedibus brunneis.*

Long. tota 3·8, alæ 2·5, caudæ 1·7.

Obs. Affinis *CALLISTÆ LABRADORIDI*, sed crassitie paulo minore, vitta frontali et regione auriculari cæruleis et colore corporis viridi minus cærulescente distinguenda.

Having recently completed a Monograph of the genus *Calliste*, it is with no ordinary interest that I look upon the present bird, which seems to be a new and hitherto unrecognized member of the group. A close ally of *Calliste labradorides* of the New Granadian Andes, it doubtless represents that species in South-eastern Peru and Bolivia, just as *Calliste xanthocephala* replaces *Calliste venusta* in the same locality. The single specimen sent by M. Verreaux is not in very perfect plumage ; but its distinctness from its New Granadian representative is easily seen on comparison. The whole of the fore part of the head of *C. labradorides* is of a shining green, leaving the nape and back of the neck black. In the present bird there is merely a narrow post-frontal band, which, like the ear-coverts, is deeply tinged with blue. The black chin of *C. labradorides* appears to be absent in the present bird ; and the under surface is not tinged with blue. In *C. labradorides* the small coverts on the bend of the wing are of a bright shining blue, which is also absent in this new species.

5. *CALLISTE XANTHOCEPHALA* (Tsch.), Sclater, Mon. of Call. pl. 44. fig. 1. p. 99.

Two examples of this scarce species of *Calliste* are in M. Verreaux's collection.

3. ON A COLLECTION OF BIRDS RECEIVED BY M. AUGUSTE SALLÉ FROM OAXACA IN SOUTHERN MEXICO. BY PHILIP LUTLEY SCLATER.

I have again the pleasure of bringing before the notice of the Society one of M. Sallé's series of beautifully prepared skins of Mexican

birds. M. Adolphe Boucard—M. Sallé's correspondent—who formed the present collection, has lately changed his quarters from Vera Cruz into the State of Oaxaca on the Pacific side of the dividing range. The precise localities, where he has mostly worked, are La Parada, a village situated at about six leagues from Oaxaca at an elevation of about 10,000 feet in the cold region, and San Miguel de las Peras, about two leagues from the same city, in the temperate region. The species collected are over eighty in number; and though there are not many of them which I consider absolutely new to science, there are several birds of very great interest, and which are to be seen but rarely in the Museums of Europe. Comparing this collection with those which I have previously examined from Cordova and the adjacent portion of the Atlantic slope, we notice considerable differences. Taking, for example, the Wood-warblers from each, we find from

Oaxaca.	Cordova.
<i>Dendroica auduboni.</i>	<i>Dendroica coronata.</i>
— <i>nigrescens.</i>	— <i>pensilis.</i>
— <i>townsendi.</i>	— <i>virens.</i>
— <i>olivacea.</i>	— <i>olivacea.</i>

This at once lets us into the secret that the western and eastern species descend respectively on their own side of the continent from north to south—the first three birds from Oaxaca being all Californian species, and those from Cordova species which are found in the Eastern States; while *D. olivacea*, which occurs in both localities, is not known to go further north than Texas, and its occurrence even in that country may be considered questionable. There are several other birds of different groups in this collection, such as *Helminthophaga celata*, *Vireo huttoni*, *Cyanocitta californica*, &c., which are exclusively western species. Altogether there are at least 35 species in this collection which I have not met with from the localities on the eastern slope; and I have thought it advisable to give a list of the whole, so as to contribute something towards a knowledge of the range of species.

1. URUBITINGA ANTHRACINA (Nitzsch), antea, p. 129.
♂ juv., Parada, Oct. 1857.

2. ACCIPITER FUSCUS (Gm.).
♂, Parada, Jan. 1858.

3. TINNUNCULUS SPARVERIUS (Linn.).
♂, Parada, Oct. 1857.

4. SYRNIUM NEBULOSUM (Forst.), Cass. B. Cal. p. 184.
Parada, Dec. 1857.

5. NYCTALE ACADICA (Gm.), Cassin, B. Cal. p. 186.
♂, Cinco Señores, Oct. 1857.

The occurrence of these two owls so far south is very interesting, and has not hitherto, I believe, been noted.

6. *SCOPS MACCALLI*, Cassin, B. of Cal. p. 180.
♂, Parada, Dec. 1857.

I cannot quite make this bird fit Mr. Cassin's description ; but it certainly has the general appearance of *Scops asio*, and is smaller, measuring, whole length 7·0, wing 5·2, tail 2·8. There are traces in the colours above of the lingering red plumage, which is said by Mr. Cassin (in the General Report of the U. S. R. R. Expedition and Surveys) to characterize the young of this species as well as of *Scops asio*.

7. *ANTROSTOMUS MACROMYSTAX* (Wagl.) ?

Caprimulgus macromystax, Wagler, Isis, 1831, p. 533 ; Cassin, B. Cal. p. 240.

♂. Parada, Oct. 1857.

I regard this *Antrostomus* as very likely to be Wagler's *A. macromystax*,—it agreeing with all the characters he gives of that species, and several other birds noticed by Wagler in the same paper being in this collection. The specimen bears a general resemblance to *A. vociferus*, but is rather larger, and the wings and tail longer. The rectal bristles are particularly stiff and long, the longest measuring 1·8 inch in length, which is quite as long as the "head without the bill." The plumage above is more closely freckled than in *A. vociferus*, particularly on the head (which is variegated nearly the same as the back), and presents the black vertical line much less distinctly. The wings and tail are coloured nearly as in *A. vociferus* ; but the ground-colour is darker, being nearly black, and the white tips of the outer tail-feathers are much broader, except on the outer web of the outer feather, which the black advances far down, leaving only a narrow white termination. Whole length of skin 9·7, wing 6·7, tail 5·0.

8. *PETROCHELIDON SWAINSONI*.

Hirundo melanogaster (!), Sw. Phil. Mag. 1827, p. 366.

Nitenti-cærulescenti-nigra, fronte, lateribus capitis, cervice undique cum gula et pectore antico late rufis : macula pectorali nigra : uropygio pallide rufescenti-fulvo : alis caudaque obscure brunneis : abdomine albo, crasso rosacescente : rostro nigro : pedibus brunneis.

Long. tota 5·0, alæ 4·1, caudæ 2·0.

Obs. Inter *Petrochelidonem lunifrontem* ex America Boreali, et *P. fulvam* ex insula Jamaica media ; huic fronte rubra, illi vero uropygio pallidiore et macula pectorali nigra magis affinis !

♂, Oaxaca, June 1857.

This interesting bird, which has now for the first time come under my notice, is a close ally of *P. fulva* and *P. lunifrons*, and in some respects intermediate between the two, as I have just pointed out. The front is rufous, like the sides of the head and collar behind, and shows no trace of the whitish mark which so eminently distinguishes *P. lunifrons*. It is also inferior in size to my specimen of that spe-

cies, but larger than *P. fulva*. I have little doubt it is Swainson's *H. melanogaster*, which I believe has remained unknown to naturalists since the time he described it, though the name has been mixed up by Audubon and Bonaparte with the synonyms of *P. lunifrons*. But as it appears ridiculous to continue the use of this name to a bird with a *white belly*, I have substituted *Swainsoni* as its specific appellation, in conformity with the Rules for Nomenclature adopted by the British Association.

9. PETASOPHORA THALASSINA (Sw.).

10. CÆLIGENA FULGENS (Sw.).

11. DELATTRIA HENRICI (Less.).

12. DELATTRIA RHAMI (Less.).

13. DELATTRIA CLEMENCIÆ (Less.).

14. AMAZILIUS ARSINOË (Less.).

15. CIRCE LATIROSTRIS (Sw.).—*Trochilus latirostris*, Sw. Phil. Mag. 1827, p. 441.—*Orniemya lessoni*, Delattre, Rev. Zool. 1839, p. 15?

16. SAPPHIRONIA LUCIDA (Shaw).

17. SELASPHORUS PLATYCERCUS (Sw.).

18. SELASPHORUS RUBER (Linn.).

19. TRYPHÆNA HELOISÆ (Less. & Del.).

All these Humming-birds, except *Circe latirostris*, *Sapphironia lucida*, and *Selasphorus ruber*, are included in the list of M. Sallé's collection from Cordova (see P. Z. S. 1856, p. 287 *et seq.*).

20. PICOLAPTES LEUCOGASTER (Sw.), Phil. Mag. 1827, p. 440; Lafr. Rev. Zool. 1850, p. 150.

♂ et ♀ similes, sed fœm. paulo minor, Parada, Oct. 1857.

21. CETHIA MEXICANA, Reichb. P. Z. S. 1856, p. 290.

♂ et ♀ similes, Parada, Oct. et Dec. 1857.

Easily distinguishable from *C. americana*, on comparison, by its darker head, back, and wings, and dark chestnut-red rump. Long. tota 5·0, alæ 2·5, caudæ 2·5, nearly the same as *C. americana*.

22. SALPINCTES MEXICANUS (Sw.), P. Z. S. 1857, p. 212.

♂, Oaxaca, May 1857.

23. TROGLODYTES BRUNNEICOLLIS, sp. nov.

♂, Parada, Dec. 1857.

Supra terricolori-brunneus superciliis et capitis lateribus rufescentibus, regione postoculari nigricanti-brunnea, uropygio saturatiore brunneo et hujus plumis quibusdam intus apicem versus albo maculatis: alis extus, et cauda tota lineis angustis

nigris regulariter transvittatis : subtus clare fulvo-rufescens abdomine medio albidiore, ventre imo, lateribus et crasso nigro anguste transvittatis : rostro superiore nigricante, inferiore cum pedibus pallide brunneis.

Long. tota 4·4, alæ 2·0, caudæ 1·7.

This little Wren is very closely allied to *T. aedon* of the United States, of which I have also specimens from Guatemala; but it is readily distinguishable by its clear, rufous under surface, more distinct supercilia, and rather darker upper plumage. On disturbing the feathers of the uropygium, a small white medial spot is seen in the interior, as in *T. aedon* and several other species.

24. *CAMPYLORHYNCHUS MEGALOPTERUS*, Lafr. Rev. Zool. 1845, p. 339; DesMurs, Icon. Orn. pl. 54.

♂ et ♀ similes, Parada, Dec. 1857.

These specimens settle the locality of this bird, which was not certainly known. I do not make the dimensions quite so large as M. de Lafresnaye (these examples measuring, long. tota 6·9, alæ 3·5, caudæ 3·3), but I have little doubt the species is the same.

25. *MNIOTILLA VARIA* (Linn.), P. Z. S. 1856, p. 291.

♂, Parada, Oct. 1857.

26. *HELMINTHOPHAGA RUFICAPILLA* (Wils.), P.Z.S. 1856, p. 291. ♂ et ♀, Parada, Aug. 1857.

27. *HELMINTHOPHAGA CELATA* (Say), Bp. Am. Orn. pl. 5. fig. 2. Parada, Dec. 1857.

Rather larger in dimensions than a Californian specimen in my collection, but apparently hardly distinct.

28. *DENDROICA AUDUBONI* (Townshend), Aud. B. Am. ii. pl. 77.

♂ et ♀, Parada, Oct. 1857.

29. *DENDROICA TOWNSENDI* (Nuttall), Aud. B. Am. ii. pl. 92. —*Sylvia melanocausta*, Licht. MS.

♂ et ♀, Parada, Oct. 1857 and Jan. 1858.

Of this rare and beautiful species the Bremen Museum (as I am informed by Dr. Hartlaub) possesses specimens (as also of *D. nigrescens*) collected by Wahlberg near Sitka in Russian America in 57° N.L., Oaxaca being in 17° N. L. nearly! This gives a distance of no less than 40° of latitude to the range of the migration of this species.

30. *DENDROICA OLIVACEA* (Giraud), P. Z. S. 1856, p. 291.

♂, Parada, Jan. 1850.

31. *DENDROICA NIGRESCENS* (Townsend); Aud. B. Am. ii. pl. 94.—*Sylvia halsei*, Giraud, B. Texas, pl. 3. fig. 1(♀).

♂ et ♀, Parada, Dec. 1857.

There can be no doubt, on comparison, that M. Giraud's plate is intended for the female of this species. Mr. Cassin informed me that this was likely to be the case. All these three species of Wood-

warblers are in fine plumage. I have already adverted to the interest of their occurrence here.

32. *PARULA SUPERCILIOSA* (Hartlaub).—*Sylvia mexicana*, Licht. in Mus. Berol.—*Parula mexicana*, Bp. Consp. p. 310.—*Compsothlypis mexicana*, Cab. Mus. Hein. p. 21.—*Conirostrum superciliosum*, Hartlaub, Rev. Zool. 1844, p. 215.

♂ et ♀, Parada, Oct. 1857.

The female (so marked) of this pretty species only differs from the male in its less bright colouring, and the cervical spot not being so distinct. I have examined the type of Dr. Hartlaub's description, which is in the Museum at Bremen, and can vouch for its identity with this bird. In M. Sallé's former collections from the eastern coast we had *Parula americana*. See P. Z. S. 1857, p. 202.

33. *MYIIDIOTES PUSILLUS* (Wilson), P. Z. S. 1856, p. 291.

♂, Parada, Jan. 1858.

34. *BASILEUTERUS RUFIFRONS* (Sw.), P. Z. S. 1856, p. 291.

♂, Parada, Oct. 1857.

35. *SETOPHAGA PICTA*, Sw. P. Z. S. 1856, p. 292.

♂, Parada, Jan. 1858.

A young bird of this species, before the first moult, is of a uniform slaty-brown, with the wing-coverts and outer tail-feathers white.

36. *SETOPHAGA MINIATA*, Sw. P. Z. S. 1856, p. 292.

♂, Parada, Oct. 1857.

37. *CARDELLINA RUBRA* (Sw.), P. Z. S. 1856, p. 292.

♂ et ♀ similes, Parada, Dec. 1857.

38. *CARDELLINA RUBRIFRONS* (Giraud).—*Muscicapa rubrifrons*, Giraud, B. Texas, pl. 7. fig. 1 (1840).—*Cardellina amicta*, Bp. Consp. p. 312, ex Dubusi icon. inedit.—*Parus erythropis*, Licht. in Mus. Berol.

♂, Parada, Dec. 1857.

39. *SIALIA WILSONI* (Sw.), P. Z. S. 1856, p. 293.

♂, Parada, Oct. 1857.

40. *PARUS MERIDIONALIS*, Sclater, P. Z. S. 1856, p. 293, et 1857, p. 81.

♂, Parada, Dec. 1857.

41. *LOPHOPHANES WOLLWEBERI* (Bp.), Compt. Rend. xxi. p. 478; Cass. B. Cal. p. 19.—*Parus annexus*, Cass. Pr. Ac. Phil. v. p. 103.—*Lophophanes galeatus*, Cab. Mus. Hein. p. 90.

♂ adult. et juv., Parada, Jan. 1858.

42. *PSALTRIIPARUS MELANOTIS* (Sandb.).—*Parus melanotis*, Sandbach, Pr. Brit. Ass. vi. p. 99; Hartl. R. Z. 1844, p. 216; Cass.

B. Cal. p. 20 ; Westerm. Bijdr. tot de Dierk. pt. 2.—*Psaltriparus personatus*, Bp. Compt. Rend. xxi. p. 478.

♂ et ♀, Parada, Dec. 1857, et Jan. 1858.

43. *SITTA CAROLINENSIS*, L. ?

♂ et ♀, Parada, Oct. 1857.

M. Sallé's collection contains examples of both sexes of a Nuthatch similar to *S. carolinensis* of the United States, but of inferior dimensions ; and, as regards the bill, remarkably smaller. Mr. Cassin has lately separated the Californian representative of *S. carolinensis* from its eastern prototype, under the name *S. aculeata* ; but this is distinguishable "by its longer and more pointed bill"—the very reverse of the variation in the Mexican birds. The dimensions of this species are as follows :—

♂. Long. tota 4·9, alæ 3·4, caudæ 1·8, rostri a rictu 0·8.

♀. Long. tota 4·8, alæ 3·35, caudæ 1·75, rostri a rictu 0·65.

As far as I recollect, the specimens of this bird from Vera Cruz, there, were of the ordinary size.

44. *REGULUS CALENDULA*.

Parada, Nov. 1857, juv.

45. *TURDUS MIGRATORIUS*, Linn. P. Z. S. 1856, p. 294.

Parada, ♀ juv.

46. *TURDUS SILENS*, Sw. Phil. Mag. 1827, p. 369 ; North. Zool. ii. p. 186.

♂ et ♀ similes, Parada, Jan. 1858.

This is evidently the true *T. silens* of Mr. Swainson, and agrees with his detailed description in the 'Northern Zoology.' Professor Baird has given an excellent account of this puzzling little group of Thrushes in his General Report on North American birds, the first sheets of which he has been so kind as to send to me by post. He was, however, unacquainted with this bird, and seems inclined to refer the name to a Mexican variety of *Turdus pallasii*. The upper surface of this bird is paler and more greyish than that of *T. swainsoni*. From that bird, however, it may be readily distinguished by its yellowish-brown tail—which, however, is not nearly so deeply tinted as in *T. pallasii*.

47. *FORMICIVORA BOUCARDI*, sp. nov.

Nigra : interscapularium basibus, carpo summo, tectricibus alarum inferioribus, maculis parvis in tectricibus alarum superioribus et caudæ rectricum lateralium apicibus albis : rostro et pedibus nigris.

Long. tota 4·3, alæ 1·9, caudæ 1·8.

♂, Acatepec, April 1857.

This is the first bird of the subfamily *Formicivorinæ* I have seen from the north of the isthmus of Panama ; and I call it by the name of its discoverer, M. Adolphe Boucard, whose collections of beautifully prepared skins have much increased our knowledge of the

Southern Mexican Avi-Fauna. It is most nearly allied to *Formicivora quixensis* of my lately published 'Synopsis of Formicariidæ' (*vide antea*, p. 241), but may be distinguished by its smaller size, shorter wings, and the small size of the white wing-spots, which in *F. quixensis* are much more prominent.

48. *MUSCIVORA MEXICANA*, Sclater, P. Z. S. 1856, p. 295.

♂, Acatepec, April 1857.

The crest of this specimen is of a bright blood-red tipped with glancing purple; but the longer bill at once distinguishes it from the two South American species. The length of the bill from the gape is 1.3, in my example of *M. regia* only 1.0.

49. *CONTOPUS BOREALIS* (Sw.).—*Tyrannus borealis*, Sw. N. Z. pl. 35.—*Tyrannus cooperi*, Nuttall.

♂ et ♀, Parada, Oct. 1857.

This Tyrant is distinguishable by its very long wings, which extend two-thirds of the way down the tail. *C. virens*, the type of Cabanis's genus *Contopus*, has also long wings, but is remarkable for its diminutive feet and short tarsi. In this bird the tarsi are pretty strong, and the hind claw rather elongated.

50. *EMPIDONAX BAIRDI*, sp. nov.

Supra pallide olivaceus, capite subcristato; lorix et regione oculari flavescens: subtus sulphureo-flavus, ventre imo saturatiore, pectore et lateribus corporis magis virescentibus: alis brunnescenti-nigris, tectricum alarum apicibus latis et secundariorum marginibus externis ochraceiscenti-flavidis; itaque alis bifasciatis: cauda brunnescenti-nigra, pallido olivaceo extus marginata: rostro superiore nigricanti-brunneo, inferiore flavo; pedibus nigerrimis.

Long. tota 5.3, alæ 3.0, caudæ 2.6.

I have been unable to identify this bird with any of the described species of this genus, and accordingly propose to call it after my friend Prof. S. F. Baird of Washington, who is particularly well-acquainted with the group to which it belongs, and has the merit of being the original discoverer of two of the North American species. Were it not for the full information as to the other species which I have derived from the pages of his new Report upon North American Ornithology, I should have feared to characterize the present bird as new.

The *Empidonax bairdi* may be placed next to the *E. flaviventris*, Baird, with which it agrees in the colouring of the lower surface, though perhaps a shade more creamy yellow on the belly. Above, however, it is not of the same full olive, but more rufescent in tinge; besides, the head is somewhat crested, the beak is longer and narrower, the general dimensions are larger, and bands on the wings are buffy yellowish instead of being white or yellowish white.

51. *EMPIDONAX FULVIFRONS* (Giraud).—*Muscicapa fulvifrons*, Giraud, B. of Texas, pl. 2. fig. 2.

M. Sallé's collection contains a single specimen apparently refer-

able to this species, of which I have likewise an example from Texas or Northern Mexico. The dimensions of these birds are slightly inferior to those assigned by M. Giraud ; but his description agrees, and the species seems to be the same.

52. EMPIDONAX — ?

♀ et ♂ similes, Parada, Oct. 1857.

A species very closely allied to the last, but larger and deeper ferruginous below, of which I have likewise examples in my own collection from Orizaba.

53. TYRANNUS INTREPIDUS (Linn.) ; Wils. Am. Orn. ii. pl. 13. fig. 1.

Acatepec, March 1857.

This is the first occasion on which I have seen specimens of this bird from Southern Mexico. Its occurrence has, however, been already noted by Swainson (Phil. Mag. 1827, p. 368).

54. VIREO HUTTONI, Cassin, Pr. Ac. Sc. Phil. v. p. 150, pl. 10. fig. 1.

♂, Cinco Señores, Oct. 1857.

This specimen seems to agree with Mr. Cassin's figure and description of the Californian *Vireo huttoni*. It is not more surprising to find it here so far south, than to meet with the Californian *Dendroica* and *Cyanocoraces*, which is the case in this collection.

55. VIREO GILVUS (Vieill.).—*Vireosylva gilva*, Cass. Pr. Ac. Sc. Phil. v. p. 153 ; P. Z. S. 1856, p. 298.

♀, Oaxaca, June 1857.

As this species possesses the first spurious primary (always absent in *Vireosylva*), ought it not to be referred to the genus *Vireo* ?

56. AMPELIS CEDRORUM, Vieill. P. Z. S. 1856, p. 299.

♂ juv., Parada, Jan. 1858.

57. PTILOGONYS CINEREUS, Sw. 1856, p. 299.

♂, Parada, Oct. 1857.

58. MYIADECTES OBSCURUS (Lafr.), P. Z. S. 1857, p. 213.

♂, Parada, Dec. 1857.

59. CYANOCITTA CALIFORNICA (Vig.).—*Garr. californicus*, Vig. in Beachey's Voy. pl. 5 ; Bp. Consp. p. 377.

♂, Parada, Dec. 1857.

Not quite mature ; but the white eyebrows, which distinguish the species, are sufficiently noticeable to betray its identity with this Californian species.

60. CYANOCITTA CORONATA (Sw.).—*Garr. coronatus*, Sw. Phil. Mag. 1827, p. 437 ; Jard. Selby. Ill. Orn. pl. 64.

♂, Parada, Oct. 1857.

61. *ICTERUS PARISIORUM*, Bp. P. Z. S. 1837, p. 110.—*Icterus scottii*, Couch, Pr. Ac. Sc. Phil. vii. p. 66.

♂ adult. et juv., Parada, Oct. et Dec. 1857.

I have specimens of this bird in my own collection from Northern Mexico. The female, which I believe has not yet been noticed, is greenish-brown above, with darker centres to the back-feathers, and the coverts and secondaries of the dull black wings margined broadly with white. Below yellowish-olive, brighter in the middle of the body.

62. *ICTERUS PUSTULATUS* (Wagl.), Bp. Consp. p. 435.
Parada, Oct. 1857, juv.

63. *HEDYMELES MELANOCEPHALUS* (Sw.), P. Z. S. 1856, p. 213.

64. *SPERMOPHILA TORQUEOLA*, Bp. Consp. p. 495.
♂, Oaxaca, June 1847.

Supra nigra, dorso postico pallide rufo; speculo alari albo: subtus pallide rufa, gutture albicante, torque pectorali lato nigro: rostro et pedibus nigris.

Long. tota 4·0, alæ 2·1, caudæ 1·9.

This is the only *Spermophila* which I have yet met with occurring northward of Panama besides *Sp. moreletii*. The latter bird was in M. Sallé's former collections.—See P. Z. S. 1856, p. 302. I have specimens of the present species in my collection from Northern Mexico.

65. *BUARREMON BRUNNEINUCHUS* (Lafr.).
♂, Parada, Oct. 1857.

66. *PYRANGA HEPATICA* (Sw.).
♂ et ♀, Parada, Oct. 1857.

67. *EUPHONIA ELEGANTISSIMA* (Bp.).
♂, Parada, Oct. 1857.

I have already noticed all these three Tanagers in the collections from Vera Cruz.

68. *CHRYSOMITRIS NOTATA*, DuBus.—*Carduelis magellanica*, Aud. ed. 2. pl. 182; P. Z. S. 1856, p. 304.
♂ et ♀, Parada, Dec. 1857.

69. *CHRYSOMITRIS MEXICANA* (Sw.), P. Z. S. 1856, p. 303.
♂ et ♀, Oaxaca, June 1857.

70. *CARPODACUS HÆMORRHOUS* (Licht.), P. Z. S. 1856, p. 304.
♂, Oaxaca, June 1857.

71. *PASSERCULUS ALAUDINUS*, Bp. P. Z. S. 1856, p. 305.
♂, Parada, Oct. 1857.

72. *PASSERCULUS LINCOLNI* (Aud.).—*P. sonarius*, Bp. P. Z. S. 1856, p. 305, ♂.

73. *SPIZELLA SOCIALIS* (Wilson), P. Z. S. 1856, p. 305.

♂ et ♀, Parada, Jan. 1858.

74. *JUNCO CINEREUS* (Sw.); Bp. Consp. p. 486; P. Z. S. 1856, p. 306.

♂, Parada, Oct. 1857.

Professor Baird informs me that I was in error in identifying this bird with *Struthus caniceps* of Woodhouse (which I have done in P. Z. S. 1857, p. 7), the latter bird, from New Mexico, having the red colour confined to the interscapularies, and not extending over the wing-coverts as in the present bird.

75. *ATLAPETES PILEATUS*, Wagl. Isis, 1831, p. 526; Bp. Consp. i. p. 486.

♀, Parada, Dec. 1857.

This curious bird is placed by some authors in the Tanagrine series near *Buarremon*. It is, however, remarkable for its short bill and short wings, the primaries only extending 0·3 inch beyond the secondaries, and in this latter respect comes nearer to *Embernagra rufivirgata* of Lawrence. The hind claw is very short, and the structure quite different from that of typical *Embernagra*.

76. *PIPILO ALBICOLLIS*, sp. nov.

Supra griseo-fulvus unicolor, alis caudaque saturatioribus: loris et tectricum minorum apicibus albescentibus: subtus griseus, collo antico et gastræo medio pure albis, gula et ventre imo cum crasso rufis: rostro plumbeo, mandibulæ inferioris basi brunnea: pedibus pallide brunneis.

Long. tota 7·6, alæ 3·4, caudæ 3·6, tarsi 1·075, rostri a rictu 0·6. San Miguel de las Peras, May 1857, ♂.

This bird belongs to the same group as *P. fuscus*, Sw., *P. mesoleucus*, Baird, and *P. aberti*, Baird, but seems specifically distinct from all of them. Its clear white throat at once distinguishes it from the former and latter, while from *P. mesoleucus* (as described by Baird, and as shown by a specimen in my collection, which I refer to that species) it differs in the entire absence of any rufous colouring on the head, the whole upper surface being of a perfectly uniform greyish brown.

77. *PIPILO MACULATUS*, Sw. Phil. Mag. 1827, p. 434; Jard. & Selb. Ill. Orn. pl. 31 ♂, 32 ♀.

♂ et ♀, Parada, Oct. and Dec. 1857.

78. *CHAMÆOSPIZA TORQUATA* (DuBus).—*Pipilo torquatus*, DuBus, Rev. Zool. 1848, p. 246; Bp. Consp. p. 487.

♀, Parada, Jan. 1858.

Chamæospiza, gen. novum.

Rostrum *PIPILONIS*, sed brevius et magis crassum: alæ breves, rotundatæ, remigibus quarto, quinto et sexto æqualibus et lon-

gissimis: pedes maximi, fortissimi; tarsi crassis, unguibus elongatis, horum postico longissimo.

The enormous size of the feet and length of the hind claw of this bird render it easily distinguishable from any other of the American Ground-finches, and seem to necessitate its generic isolation. The plumage, moreover, is exactly that of the *Buarremones*!

79. *COLAPTES MEXICANUS*, Sw. P. Z. S. 1856, p. 307.
♂, Parada, Oct. 1857.

80. *MELANERPES FORMICIVORUS*, Sw. P. Z. S. 1856, p. 307.
♂, Parada, Oct. 1857.

81. *PICUS VARIUS*, Linn. P. Z. S. 1856, p. 308.
Parada, Oct. 1857.

82. *GEOCOCYX AFFINIS*, Hartl. Rev. Zool. 1844, p. 215; Gray, in Mitch. Gen. of B. pl. 114.
♂, Durasnal, Sept. 1857.

Dr. Hartlaub has correctly pointed out the differences between this species and *G. mexicanus*, which, as he rightly observes, is the only other known species of the genus; and the figure in the "Genera of Birds" is good. It is certainly curious that *Geococcyx mexicanus*, which is common in California, should cross the centre of the continent (occurring in New Mexico and Texas), and pass down the eastern slope into Vera Cruz, while in the southern part of the western slope and in Guatemala, this bird appears to take its place. Dr. Gambel has some excellent remarks on these birds in the Transactions of the Academy of Philadelphia, i. p. 217.

83. *CHLORGENAS FASCIATA* (Say), P. Z. S. 1856, p. 309.
Oaxaca.

84. *ZENAIDA LEUCOPTERA* (Linn.), P. Z. S. 1856, p. 309.
Parada, Jan. 1858.

85. *ZENAIDURA CAROLINENSIS* (Linn.).
♂, Parada, Jan. 1858.

This appears to be identical with the bird of the United States. I have never seen the (so-called) second species *Z. marginella* (Woodhouse).

86. *CYRTONYX MASSENA* (Less.); Cassin, B. of Cal. pl. 4; Gould, Mon. Odontoph. pl. 2.
♂, Parada, Aug. 1857.

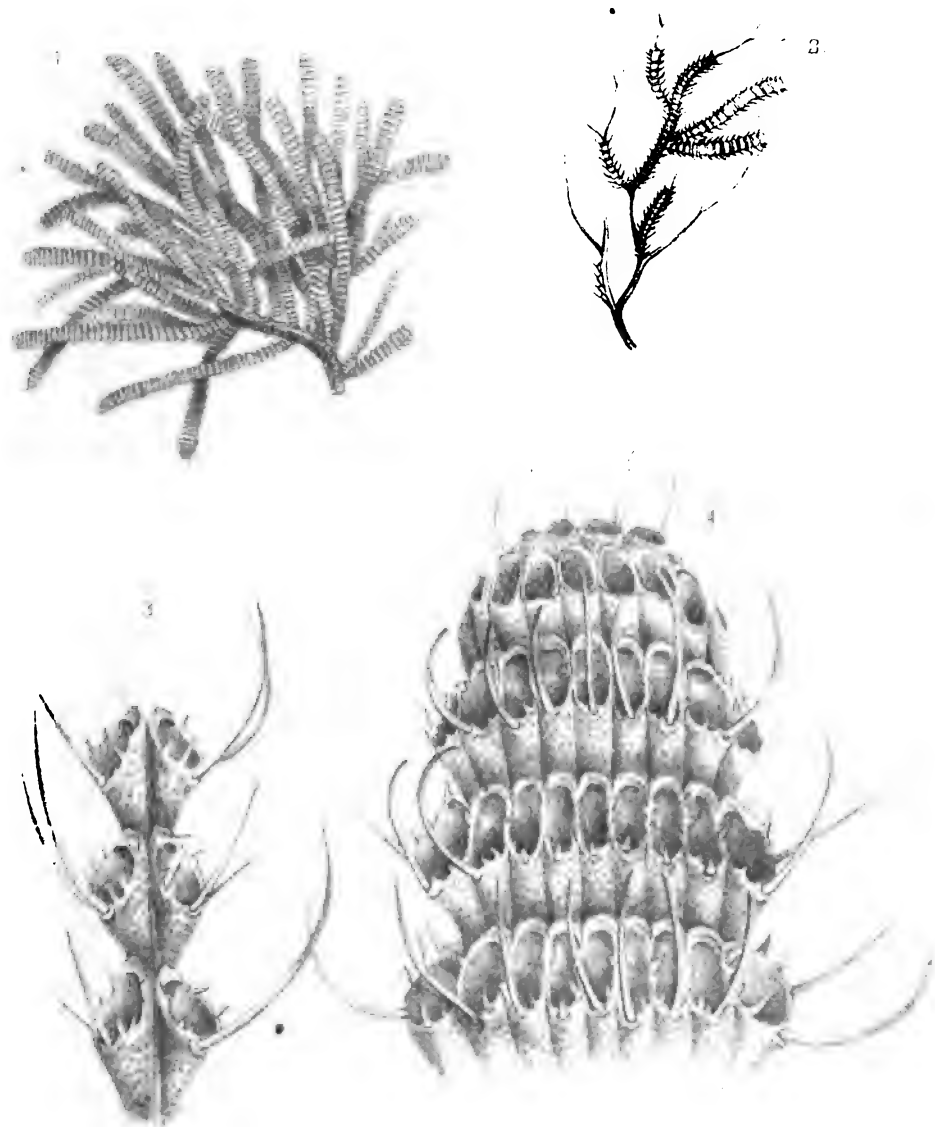
4. ON *ELECTRA VERTICILLATA*, WITH A NOTICE OF ITS DIFFERENT FORMS OF GROWTH. BY E. W. H. HOLDSWORTH, F.L.S., F.Z.S., ETC.

(Radiata, Pl. XIII.)

The fact that but little attention has been given to a remarkable variety of growth in *Electra verticillata* must be my apology for bringing before this Society an animal that was first noticed more than seventy years ago. Ellis described this species in 1786, under the name of "*Flustra verticillata*," or the "Basket-work Sea Matt," from a specimen that he received from the Mediterranean; and he was followed by other naturalists, who retained the same title for it. In 1824 Lamouroux's translated work '*Corallina*' was published in England, from which it appears that, observing the branched polypidoms and verticillate arrangement of the cells in this species, he proposed a genus for its reception under the name of *Electra*; and in this he was supported by many subsequent writers, including Risso, Cuvier, and Blainville,—the last-mentioned author, however, stating that *Electra* could hardly be separated from *Flustra*.

Its true position appears to be close to *Membranipora*, but distinct from it on account of the regular transversely linear arrangement of the cells under all its varieties of growth; this will especially distinguish it from *Flustra*, and in a less degree from *Membranipora*, where the quincuncial disposition of the cells is not so uniformly observed, and their arrangement is more frequently irregular. I am inclined to consider Lamouroux's view of the case correct, and shall therefore retain the name that he proposed for the genus.

Several naturalists have mentioned the occasional growth of *Electra* in subcompressed linear fronds; but the only published figures of the species that I know—those of Ellis, Lamouroux, and Blainville—are all taken from the cylindrical variety, which appears to have been considered as typical. My own experience of *Electra* rather points to this encrusting of slender branching sea-weeds as exceptional, and the suberect ribbon-shaped fronds as being the most common form. I have only observed the species in one locality however—on the northern shore of Portugal, near Oporto, where the free compressed variety is abundantly met with in a dried state on the beach; fourteen specimens were obtained of this shape, and only one was found of the cylindrical form usually described. The early growth of the polypidom, however, is undoubtedly encrusting, and generally on *Fucus*; but after the formation of a few cells on the surface, the erect form is assumed, and dense clusters of narrow ribbons spring up, with occasional branches budding from their edges, each ribbon being composed of a double layer of connected opposite cells, placed in transverse parallel rows of 10 or 12 in each. The cells are compressed and cup-shaped, with the walls minutely punctured, and have the margin surmounted by several irregularly placed erect denticles, and a long curved vibraculum inserted a little below the anterior edge. In the ribbon-shaped variety, these vi-



ELECTRA VERTICILLATA, Lamouroux
 Three ribbed-shaped var. 2 free and encrusting forms
 3 single of ribbon, magnified 416 side view.

bracula are generally aborted on alternate rows ; but in such cases the external cells are protected by the development of the denticles into conspicuous spines.

The variety of *Electra* usually described and figured consists simply of the disposition of the cells over the cylindrical branches of some sea-weed, and not, as has been stated by one author, "around an ideal centre."

According to Lamouroux, the polypidom in a living state is of "a red-violet colour ; but when exposed to air and light, it becomes an earthy white." The polypes are probably the same as in *Membranipora*.

Electra appears to be widely distributed ; for it is said to be common in the European Seas, and I believe Prof. Busk has received it from the Cape of Good Hope.

5. ON THE REPRODUCTION OF NEMERTES BORLASSII. BY WILLIAM BEATTIE, HONORARY SECRETARY OF THE MONTROSE NATURAL HISTORY SOCIETY. (IN A NOTE TO DR. GRAY, V.P.Z.S.)

"On the last week in February, Commander Lysaght, of the Coast Guard, brought me from one of the fishermen on the coast a very long specimen of *Lineus longissimus* (*Nemertes Borlassii*) ; after, keeping the animal alive four days, it produced a young one 18 inches long and about $\frac{2}{3}$ ds of a line or $\frac{1}{4}$ th of an inch in diameter, of a cream-colour. Both lived for nearly a week ; but in consequence of my illness the water was not changed, and the little creature died and was considerably decomposed before I knew. I have the remains in spirits. At first we fancied it must be an intestinal worm ; but its habits were the same as the supposed parent."

Dr. Baird has examined the specimen produced by the *Nemertes*. It is not in a good state ; but he is satisfied that it is not an *Ascaris* or *Filaria*, and thinks it very probably the true young of the *Nemertes*.

6. ON THE FAMILIES OF ASPERGILLIDÆ, GASTROCHÆNIDÆ, AND HUMPEREYIADÆ. BY DR. J. E. GRAY, F.R.S., V.P.Z.S., PRES. ENT. SOC., ETC.

In the 'Synopsis of the British Museum' I referred *Aspergillum*, *Clavagella* and *Gastrochæna* to the same family, under the name of *Gastrochænidæ*. A further study of the œconomy of the animal and the development of the shells have induced me to divide them into two families, and to add to them a third, founded on a recently discovered Mollusca brought by Mr. Strange from Australia, which differs from the other two in habits and œconomy.

Fam. I. ASPERGILLIDÆ.

The animal living sunk in sand, or holes in rock, or shells, enclosed in a shelly tube, the adult animal imbedding one or both of its valves in the shelly tube in which it resides, and emitting from the front of its mantle a number of tentacles which are enclosed in *tubuli* radiating from the edge or disk of the base of the enclosing tube.

This family may be divided into two, according to the adhesion of one or both valves on the substance of the tube*.

Subfamily 1. PENICILLINA.

Both the valves of the adult animal imbedded in and forming part of the shelly tubular sheath. The valves of the young animals are early united into one plate.

Aspergillum, Lamk. Hist.

The umbones of the valves are always, and a considerable part of the valves is sometimes, to be seen on the outer surface of the tube; and in the inside of the tube the united valves are to be observed extending almost two-thirds of the circumference of the cavity, and separated from the surface by a distinct groove, and marked by a large submarginal scar left by the attachment of the adductor muscles.

The tube in which the animal lives is sunk in sand or mud, and has its surface often covered with a thin coat of sand, small stones, or shells; but otherwise they are free and easily removed from this locality, and, except when they are distorted by some larger stone or coralline, they are of a regular symmetrical shape.

The older authors figured two or three kinds of these shells. Humphreys, Favanne, and Bruguière, describe two species—one “furbelowed,” and the other “unmargined,” as Humphreys defined them. Dillwyn, in his ‘Recent Shells,’ united these kinds as varieties of his *Serpula aquaria*, he still regarding them as *Serpula* fixed by the smaller end of their shell. Lamarck describes two fringed—*A. javanum* and *A. vaginiferum*, and two unfringed species—*A. Novæ Zelandiæ* and *A. agglutinans*; the two latter appear to be varieties of the same species†.

In the ‘Annals of Philosophy’ for 1825, I divided the “unruffled” kinds into two species, *A. javanum* and *A. Listeri*.

Chenu, in ‘Illustrations Conchyliologiques,’ gives a monograph of a new species of this genus, figuring a number of specimens from the

* When it was believed that the *Aspergilla*, or Watering-pot Shells, were affixed by the smaller end of the tube, with the disk upwards, these tentacles were supposed to be used to collect food. Thus Humphreys observes, “the tentacles or feelers which the animal of this curious species puts forth from the perforations of its furbelow or border to catch its food, are here artificially represented.”—*Colonne Cat.* 2.

† According to Favanne, the lower part, by which it adheres to the rock, is flexuous and twisted; and the upper part, which is straight, proceeds from it nearly at right angles (Recent Shells, 1084). See Favanne, t. 5. f. B, where the shell is represented so attached, the specimen being evidently formed of an *Aspergillum* and *Serpula* united together.

British Museum collection ; but he appears to have elevated several distorted specimens into the rank of species, and, like most modern French authors, describes his species as they came to hand, without paying any regard to the characters which separate them into natural groups.

Having had occasion to examine these specimens afresh, I propose to divide those in the British Museum into the following genera or subgenera.

As the names *Penicillus*, *Aspergillum*, *Clepsydra*, and *Arytene* have been given to this genus, I have used them for the subgenera rather than create new names. At the same time it must be observed that all these names were applied to a single species, and to quote them as the genera of the authors who first used these names would produce a very false impression ; but this is an error that is constantly committed*.

I. *The umbo and a considerable portion of the valves exposed on the outer surface of the tube. Fringe distinct, of one series of tubes.*

1. WARNEA.

The edge of the tip of the siphon periodically expanded, the umbo and great part of the valves exposed. Tube cylindrical, the siphonal end furnished with expanded plaited ruffles. Fringe distinct, of a single series of thick simple tubes. The animal unites sand, Foraminiferous shells, and even stones to its tube.

I have named this genus in honour of my friend Miss Elizabeth Warne, who translated, at Dr. Leach's recommendation, Lamouroux's 'Polypiers flexibles,' and in 1824 published it at her own expense, under the title of '*Corallina*,' and who from that time to the present has been an industrious student and collector of natural productions in various parts of Europe and Africa.

1. WARNEA VAGINIFERA.

B.M.

A. vaginiferum, Lamk. no. 2 ; Savigny, Egypt. N. Hist. t. 70. f. 91-99 ; Rüppell, Atlas, t. ; Sow. Genera, f. 12 ; Chenu, t. 1. f. 1, var. small, and t. 4. f. 9.

A. Delessertianum, Chenu, t. 1. f. 2, var. ruffles far apart.

Red Sea.

Miss Elizabeth Warne has most kindly sent me a series of twelve specimens of *Aspergillum vaginiferum* from the Red Sea for examination.

They are all adult, and very nearly of the same diameter, and the difference in the height of the tube between the basal fringe and the first "ruffle" is very slight, varying between $8\frac{1}{2}$ and 9 inches†.

* See paper "On the Development of the Shell and Tube of *Aspergillum*." (Ann. and Mag. N. H., June 1858, p. 423.)

† "M. Lamarck," observes Savigny, "en a recueilli de grandes portions de la partie antérieure du tube. Il doit avoir plusieurs pieds de longueur (Lamk. Hist. no. 2)." The largest I have seen is about 13 inches.

The tubes of the fringe and the holes in the disk are of the same diameter; and the holes in the disk are all more or less tubular.

The valves of the nucleus are very distinct, and uniform in shape and size, in all the specimens. They are oblong, with the apex rather behind the middle of the shell; and the hinder end is obliquely truncated. They resemble in form the outline of *Thracia declivis*.

They differ among themselves in the following particulars:—1. In the size and form of the exposed part of the valves, some having this part much shorter from back to front, and broader from side to side, than others. In one the valves are even longer than broad. 2. In the number and in the distance between the "ruffles" at the siphonal end, this peculiarity producing the chief difference in the length of the specimens. In general the base of the plaited part of the ruffle commences a little above the apex of the expanded part of the former ruffle; and of the nine shells agreeing in this particular, one has 3, three 4, two 5, two 6, and one 8 ruffles.

In one specimen which has four *ruffles*, which are not so much expanded as the average in the other examples, there is a considerable space between them, and the space increases in length as they are formed, so that the tube of the shell is much elongated; but one specimen is intermediate in the length of the interspaces and in the more expanded form of the ruffles.

M. Chenu, in his Monograph, considers a specimen with elongated interspaces between the ruffles a different species, under the name of *A. Delessertianum*.

One specimen has a much more slender, rather tapering, shorter tube than the rest; and it is evident that this specimen has been broken off at the apex, and a new series of ruffles have been formed on the broken apex: the first or lowest ruffle is irregular in form, to adapt itself to the broken edge; the rest are regular; and they are all closer together than usual.

2. WARNEA AUSTRALIS.

B.M.

Asp. australe, Chenu, t. 3. f. 1.

A. incertum, Chenu, t. 4. f. 6, a fragment.

A. Cumingianum, Chenu, t. 3. f. 4, variety?

Australia, Swan River.

Aspergillum incertum, Chenu, t. 4. f. 5, is probably the same as *A. australe*, as it is said (but on what authority I know not) to come from the same locality; but it is so distorted by the stones in the sand in which it lived, as to render it almost impossible to determine it with certainty. This specimen has been broken in the middle of the tube when the animal was alive; and it has been repaired by the animal, part of the broken part of the tube forming a kind of sheath to the repaired portion.

The specimens of *Aspergillum Cumingianum* in Mr. Cuming's collection appears to be only a very distorted specimen of *Warnea vaginifera* or *W. australis*, without any marginal fringe. The tube is very irregular, with scattered moderate-sized stones and impressed grooves in every direction, as if it had lived where the animal must

have been much pressed on by surrounding bodies; and this has probably prevented the proper development of the fringe of tentacles to the edge of the mantle. The valves are of the same form, and exposed as in that genus. In one of our specimens of *Warnea vaginifera* from the Red Sea, sent with the others by Miss Warne, the fringe is very imperfectly developed, and forms a passage to the shell in Mr. Cuming's collection.

2. ASPERGILLUM.

The edge of the top of the siphon not expanded. Umbo and great part of the valves exposed. Tube conical, tapering to a simple, rather compressed siphonal end. Fringe distinct, formed of a single series of elongated united tubes that are repeatedly forked. The tubes smooth externally.

1. ASPERGILLUM LISTERI.

B.M.

A. Listeri, Gray, Ann. Phil. 1825.

Phalus testaceus, Lister, Conch. t. 548. f. 3, distorted.

A. javanum, Lamk. ?, Chenu, t. 2. f. 1 (not 5).

Penicillus ambiguus, Desh. MS.

Serpula harpagium major. *The Furbelowed Watering-pot*, Humph. Calonne Cat. ii.

Penicillus. *The Watering-pot*, DaCosta, Elem. t. 2. f. 8, imperfect.

The perforated Serpula (Serpula perforata), Shaw, Nat. Misc. vi. t. 188.

Exposed part of valves distinctly marked.
Singapore.

2. ASPERGILLUM PULCHELLUM.

B.M.

A. pulchellum, Desh.

A. javanum, Chenu, t. 2. f. 2.

Exposed part of the valve indistinctly marked.
Mozambique.

Perhaps not distinct from the former.

Penicillus javanus, Bruguière (*Aspergillum javanum* of Lamk. and Deshayes), included all the Watering-pot shells with a distinct frill and without any ruffles at the siphonal aperture.

Dillwyn observes, "This shell when perfect is nearly a foot long, and more than an inch in diameter at the dilated summit." This is far larger than any *Aspergillum Listeri* I have seen: it fits better *Warnea vaginifera*; but that species was not known until the French expedition into Egypt.

Gumner (in the Drontheim Gesellsch. Schrift. iv. t. 4. f. 9-11) figured the perforated terminal disk of this shell as a *Millepore*, under the name of *M. causia*. Guettard (Mém. iii. 558. t. 70. f. 1) figured the tube of a species as a kind of *Bunode*.

3. ASPERGILLUM ANNULUS.

Aspergillum annulus, Deshayes, MSS. ; Mus. Cuming.

Tube tapering ; valves very short and broad ; tubes of the fringe very slender, numerous, and close, forming a thin expanded lamina.

Hab. — ?

4. ASPERGILLUM PULCHRUM.

Aspergillum pulchra, Deshayes, MSS. ; Mus. Cuming.

Tubes of fringe and disk very long and slender ; valves moderate.

Hab. — ?

- II. *The umbo or nucleus of the valves alone exposed on the outer surface of the tube, and often more or less covered with an anterior protuberance, but distinct on the inner surface. The edge of the top of the siphon not expanded.*

3. PENICILLUS.

Umbo or nucleus of the valves alone exposed on the outer surface of the tube naked ; fringe, of a single series of once-forked elongated thick tubes ; disk with scattered pores ; tube smooth externally.

1. PENICILLUS AQUARIA.

B.M.

Serpula Penes, Linn. S. N. 1267.

Serpula aquaria, Burrows, Elem. t. 22. f. 3.

Asp. javanum, Gray, Ann. Phil. 1825 ; both from Martini, t. 1. f. 7.

Asp. dichotomus, Chenu, t. 2. f. 6. Disk, holes few ; fringe perfect.

Asp. semifimbriatum, Chenu, t. 3. f. 5. Disk, holes few ; fringe imperfect.

A. sparsum, Sow. Genera, f. 3, 4, 5. Disk, holes more numerous ; fringe perfect.

A. javanum, var., Chenu, t. 2. f. 5. Fringe-tubes perfect, elongate, flexuous.

Hab. Red Sea ?

2. PENICILLUS RADIX.

Aspergillum radix, Deshayes, MSS. ; Mus. Cuming.

Tubes swollen, subglobose above or behind the valves ; nucleus only exposed, small.

Hab. — ?

4. CLEPSYDRA.

Umbo or nucleus of the valves alone exposed on the outer surface of the tube naked ; fringe formed of two or three series of crowded once or twice forked tubes ; disk with numerous small tubes ; siphonal end of the tube compressed and with a central impressed groove on each side. The animal unites sand to its tube.

1. CLEPSYDRA STRANGULATA.

B.M.

Aspergillum strangulatum, Chenu, t. 2. f. 4.

N. E. coast of Australia.

5. ARYTENE.

Umbo more or less covered with a swollen prominence in front ; the whole of the valves except the nucleus or umbo enclosed in the tube ; fringe distinct, of a single series of numerous elongated once-forked tubes ; disk with tubular holes. The animal unites sand and stones to its tube.

1. ARYTENE TUBERCULATUM.

B.M.

Aspergillum tuberculatum, Chenu, t. 2. f. 3.*A. ornatum*, ibid. t. 4. f. 3.*A. clavatum*, ibid. t. 4. f. 4. All having lived in very fine sand.*A. incrassatum*, Chenu, t. 4. f. 2. Having lived in coarse sand.*A. Recluzianum*, Chenu, t. 4. f. 1. Having lived in coarse sand, stones, &c.*Hab.* Indian Ocean.

See also *Asp. Novæ Hollandiæ*, Chenu, t. 4. f. 8 ; very like *A. Recluzianum*, from gravel, with the fringe destroyed.

The *Aspergillum zeluensis* (Chenu, t. 3. f. 3), in Mr. Cuming's collections, has the tube covered with fine sand, and it is nearly allied to *A. clavatum* ; but the disk has only two or three large tubes on each side of the central slit.

See also *Aspergillum gracilis*, Deshayes, MSS. ; Mus. Cuming.

6. FOEGIA.

Umbo more or less covered with a swollen prominence in front ; the whole of the valves except the umbo or nucleus enclosed in the tube ; fringe indistinct, formed like the hole in the disk, of short thick separate tubes. The animal unites sand, stones, &c. to its tube.

1. FOEGIA AGGLUTINANS.

B.M.

Aspergillus agglutinans, Lamk., Chenu, t. 3. f. 2.*A. Novæ Zelandiæ*, Gray, Chenu, t. 3. f. 6, 7, distorted.*Serpula harpagium minor*, *The Unmargined Watering-pot*, Humph. Cat. Calonne, ii.*Serpula aquaria*, var., Dillw. R. S. 1084.*Hab.* Australia, Cape York (*Jukes*), in fine sand ; Swan River.

A. philippinense (Chenu, t. 4. f. 7), which I have not seen, appears to be allied to the above. Chenu figures the umbones as exposed ; but he does the same with *A. agglutinans* and *Novæ Zelandiæ*, which are covered in the specimens from which he took his figures, so that I cannot depend on his accuracy in this respect.

The *Penicillus Novæ Zelandiæ* of Bruguière was established on a very bad figure in Favanne, 642. t. 70. f. E, copied in Chenu, probably taken from a specimen of this genus.

In Mr. Cuming's collection there is a specimen of this shell which has had its tube destroyed just above the valves. The animal has formed a new tube of a small size and irregular form, flattened beneath, subcylindrical, but of a smaller diameter in the middle, and compressed at the end.

Subfamily 2. CLAVAGELLINA.

Only one valve of the adult animal imbedded in the shelly tubular sheath, the others free and moveable in the cavity of the tube.

Clavagella, Lamk.

- I. *Some, like the Aspergillinae, appear to have lived sunk in sand, and are symmetrical in shape: these are only known in the fossil state.*

1. CLAVAGELLA.

The end of the siphon simple; tube free, elongate, clavate, compressed; base with diverging tubes. Living sunk in sand or gravel.

* *Base convex, with scattered tubes.*—Bacilia, Valenc.

1. CLAVAGELLA ECHINATA. B.M.

C. echinata, Lamk., Desh. Coq. Paris. i. 9. t. 1. f. 788; ed. 2. t. 2. f. 1-3.

C. cristata, Lamk., Desh. Coq. Paris. ed. 2. t. 1. f. 16-20, junior?

C. lagenalis, Desh. Coq. Paris. ed. 2. t. 2. f. 4-6.

Glycimeris margaritaceus, Lamk., shelly valve.

Hab. Fossil, Paris.

** *Base flat, with a fringe of branched tubes.*—Clavagella.

2. CLAVAGELLA CORONATA. B.M.

C. coronata, Desh. Coq. Paris. i. 8. t. 3. f. 9, 10; ed. 2. t. 1. f. 5-15.

C. caillate, Desh. Coq. Paris. ed. 2. t. i. f. 1-4.

Hab. Fossil, Paris.

- II. *Others now existing in the sea, inhabit holes in rocks or between barnacles and other fixed bodies; the tube is irregular, and modified in form by the cavity it inhabits and lines.*

2. BRYOPA, Gray, 1840.

The edge of the top of the siphon periodically expanded; tube shelly, base enclosed in a hole in the rock in which the animal resides, siphonal end of the tube expanded, ruffled; the inner surface of the tube, round the valves, is pierced with small holes.

1. BRYOPA APERTA. B.M.

Clavagella aperta, Sow. Genera Shells, no. 13. f. 1-4.

Clavagella melitensis, Broderip, Proc. Zool. Soc. 1834, p. 116; Trans. Zool. Soc. ii. p. 265, t. 35. f. 58.

Clavagella vivens, Audouin, Rang, Man. Moll. p. 342.

C. Mammoi, Maltese dealers.

Hab. Malta, in calcareous tufa.

2. BRYOPA? LATA.

Clavagella lata, Brod. Proc. Zool. Soc. 1834, p. 116; Trans. Zool. Soc. ii. 265, t. 30. f. 8-10, shell; Owen, Trans. Zool. Soc. ii. 267, t. 30. f. 11-16, animal.

Hab. Pacific Ocean.

See also *Clavagelle Rape*, Rang, Man. Moll. 339, from the Isle of Bourbon.

3. DACOSTA.

The siphon not expanded at the top; tube shelly, cylindrical; base enclosed in a hole in the rock in which the animal resides; siphonal apex of the tube simple, circular, not expanded; the inner surface of the tube, round the valves, is pierced with small holes.

I have named this genus after E. M. DaCosta, a conchologist of considerable talent in a time when the science was greatly depressed.

1. DACOSTA AUSTRALIS.

B.M.

Clavagella australis, Stutchbury, Catal. t. .f. .

Clavagella elongata, Brod. Proc. Zool. Soc. 1834, p. 116; Trans. Zool. Soc. ii. 265, t. 35. f. 1-4? Deshayes, in B.M.

Hab. Australia, Port Jackson (*Brit. Mus.*); New Zealand (*Lady Grey*); Bow Island or Hao, Pacific Ocean (*Stutchbury*).

Fam. II. GASTROCHÆNIDÆ.

The animal living sunk in sand or holes in rock and shells, enclosed in a shelly tube. The adult animal, as well as the young, free in the tube. The front of the mantle not provided with any tentacles. The tube of the adult animal closed at the base, and destitute of any slit or tubes. The siphonal end of the tube not expanded.

Subfamily 1. CHÆNAINA.

The tube symmetrical, clavate, free. The animal living free, sunk in sand.

1. CHÆNA.

Valves linear, elongate, truncated at the ends; tube free, cylindrical, close, larger end closed with a regular convexity at the base; siphonal apex simple, compressed; cavity with two imperfect septa over the upper part of the valves.

1. CHÆNA TESSELLATA.

B.M.

Chæna tessellata, Gray, Proc. Zool. Soc. 1858.

Fistulana clava, Lamk.

Hab. Philippines (*Cuming*).

2. CHÆNA ANNULATA.

B.M.

Chæna annulata, Gray, Proc. Zool. Soc. 1858.*Hab.* Mozambique ; Mauritius.

Subfamily 2. GASTROCHÆNAINA.

The tube irregular, attached. The animal living in holes in rocks, shells, and other marine bodies.

Lamarck described the shells of these animals as *Gastrochæna*, and the tubes mixed with the tubes of a species of *Pholadidæ* as *Fistulanæ*. The shape of the tube is modified by the substance in which they happen to be imbedded or attached. Sometimes the animal attaches itself to a thin marine body which does not admit of the animal burying itself into it ; it then forms a tube on the surface, to cover the part of the body which would be exposed.

2. GASTROCHÆNA.

Valves ovate, ends rounded ; tubes enclosed in a cavity, or attached to the surface of shells, irregular, retort-shaped ; siphonal aperture compressed, simple ; cavity simple.

1. GASTROCHÆNA HIANIS.

B.M.

Pholas hians, Chemn. x. t. 172. f. 1678.*Gastrochæna Sprenylex*, Nov. Acta Dan. ii. f. 8, 11.*G. cuneiformis*, Lamk. no. 1 ; Sow. Gen. f. 3-5.*Hab.* Isle of France.

2. GASTROCHÆNA MODIOLINA.

B.M.

Gastrochæna modiolina, Lamk. no. 3 ; Sow. Gen. f. 1, 2.*Mya dubia*, Penn, B. F. iv. t. 44. f. 17.

There are many other species in the British Museum and other collections which want to be specially studied.

Fam. III. HUMPHREYIADÆ.

The animal at first free and covered with two shelly valves, which become united into a single plate, which expands on the sides and in front, forming a bag-like cavity, which is attached by its outer surface to shells or rocks, and as the animal increases in size is expanded behind into a shelly tube with a circular aperture. The front of the mantle is furnished with scattered tentacles, which are emitted through tubular pores on the upper part of the front of the tube and round the circumference of the part by which it is attached.

The shells are attached to the surface of shells or rocks, and not sunk into their substance ; nor do the animals live sunk in the sand like *Aspergillidæ* and *Gastrochænidæ*.

HUMPHREYIA.

The character of the family.

I have named this genus after Mr. George Humphrey, the con-

chologist and shell dealer who published the Catalogue of M. de Calonne's collection in 1797. This catalogue is arranged in natural groups, and foreshadowed many of the genera afterwards established by Lamarck and other conchologists. I recollect him well, and was strongly impressed with his knowledge not only of the species of shells, but also of the affinities which the groups bore to each other. Though comparatively an uneducated person, he was far in advance of the state of natural history in his time.

1. HUMPHREYIA STRANGEI.

Aspergillum Strangei, A. Adams, Proc. Zool. Soc. 1852, p. 91, Moll. pl. 15. f. 5.

A. (Foegia) Strangei, A. & H. Adams, Genera Moll. p. 339.

Humphreyia Strangei, Gray, Ann. & Mag. Nat. Hist. July 1858, p. 16. f. 1, 2.

Hab. New South Wales, Sydney Bay (*Strange*).

These shells have been confounded with *Aspergillum*; but they have a very distinct appearance and mode of living, and the shell must be formed in quite a different manner.

In *Aspergillum* the shelly tube in which the animal lives is ana-

Fig. 1.



Fig. 2.



Humphreyia Strangei.

logous to the shelly tube of *Chæna*, *Gastrochæna* and *Teredo*, as I have shown in my paper on the development of this genus, in the Annals and Magazine of Natural History for June 1858; but in *Humphreyia** the tube at the end of the shell is an extension of the normal shelly valves of the animal itself, which is formed after the

* See paper "On the Structure of *Humphreyia*" (Ann. and Mag. N. H. July 1858, p. 16).

2. *CHÆNA ANNULATA*.

Chæna annulata, Gray, Proc. Zool. Soc. London, 1858, p. 10. Marine body, for part of the valves, periostracum.

Hab. Mozambique; Mauritius. Section are very different (figured in the 'Proceed-

Subfamily 2. *Gastropoda* after they become united are

The tube irregular, attached. into a tube which is separated from shells, and the front bag-like projection fill-

Lamarck described the front of the valves, which is irregularly and the tubes mixed with small rather prominent perforations, *ev-Fistulanæ*. The shell protection of the cylindrical tentacles on the which they happen; and the edge of the expanded part of the base, animal attaches to the shell on which it lived, is furnished with the animal by perforations, often placed in pairs. The entire shell to cover the thin periostracum. The posterior tubular part of

V. the tube is marked with a succession of rings, showing the period- to interruption in its growth, the prominent longitudinal lines on the outer surface being continued from one to the other, showing and longer as the animal grows, and is marked also by four equi- distant prominences on its edge, which give the tube its regular subquadrangular appearance.

In the smaller specimen, which was attached to a stone, the small valves, as soon as they were united, seem to have expanded behind and on the sides into a continuous subquadrangular tube, with scarcely any projection in front of the valves; there is a small tube arising in front and behind the dorsal edge of the valves, and curled over their back. There are only a few tubular projections on the left side of the attached part of the shell, instead of the number found on the front and sides of the other specimens.

In both the specimens the interior surface of the cavity is quite smooth and continuous, and entirely destitute of the definite line which defines the form of the proper valves of the shell, and separates them from the tube, which is always so distinctly marked in the *Aspergilla*.

The valves of the young shell appear to be rather unequal in size; that is to say, the apex of the right valves in both the species is situated rather under that of the left, as if the right valve were rather the flattest and smallest; but the difference is not very defined.

7. NOTE ON THE EGGS OF THE FRIGATE BIRD AND CROCODILE OF JAMAICA. BY E. CAVENDISH TAYLOR, M.A.

The eggs of the Frigate Bird (*Fregata aquila*), which I now exhibit, were taken by my brother, Mr. J. C. Taylor, on the 1st of January 1858, at Fonseca Bay, on the Pacific coast of the Republic of Honduras. They are of a pure white colour, and measure $2\frac{3}{4}$ inches in length by $1\frac{1}{4}$ in breadth.

Although the species of *Fregata* are not as yet very accurately determined, it is believed that the same species (*Fregata aquila*) is found on both the Pacific and Atlantic shores of Central America. The eggs of the Crocodile of Jamaica (*Crocodylus acutus*) were obtained by my brother early in the present year, on that island. They are of the elongated oval form peculiar to the Crocodilians. They are of a shining white colour, and measure $3\frac{1}{4}$ inches in length and $\frac{1}{2}$ inch in breadth.

4. CHARADELLA AND LICHENELLA, NEW FORMS OF POLYZOA FROM AUSTRALIA. BY DR. J. E. GRAY.

The first coral which I wish to bring before the Meeting is nearly allied to the genus *Amathia*—indeed some naturalists may be inclined to regard it only as a section of that genus; but as it presents a different mode of growth and habit, I think it is desirable that it should be distinguished by a distinctive name.

I may premise that the name of the larger group to which it belongs is the subject of a very unpleasant discussion. Lamouroux and Lamarck both published the genus in the year 1812 under two different names, the first calling it *Amathia* and the second *Serialia*, as is also the case with many other genera established in the same works.

There can be no doubt that these authors studied their subject, and found out what they considered natural groups, and named them, independently. Lamouroux presented his memoir on the subject to the Institute in 1810, and Lamarck was named one of the Commissioners to report on his paper; so that he had the opportunity of knowing what Lamouroux had done two years before the publication of his own work; and this has given rise to Lamarck being charged with pirating the labours of Lamouroux.

But I think any one who has known anything of the character of Lamarck must consider such a charge as groundless; and I merely cite this as an instance of the very unpleasant position in which a naturalist is placed by being called upon to examine and adjudicate on an unpublished paper of another author engaged on the same branch of study; and an opinion on such a subject by one not so engaged is generally worse than useless. I consider this one of the great objections to the system of reference which is so commonly adopted in this country, France, and America.

In France and America they do their best to obviate the evil, by making the names of the referees public, and requiring them to send in a written report, while here the referee is often only known to the officers of the society. Neither system obviates the evil which laid Lamarck open to the unpleasant, and, I believe, ungrounded charge, which has been brought against him, and which may be made against any scientific man who is called upon to read the MSS. communication of another labourer in the same field of study.

Lamouroux named one of the species of *Amathia*, *cornuta*,

because the end of the stem beyond the cluster of cells is produced into two setaceous filaments or tags. If these tags are examined, it will be found that the cells are gradually developed upon them, and they are only the commencements of the next articulations which are to bear the cells. They are to be observed, more or less developed, on all the species I have examined; and when the stem is simple, as in *A. lendigera*, there is a single tag; and when the coral is repeatedly forked, then there are two tags at the end of the last cell-bearing articulation, as is also the case in *A. lendigera*, where a branch is going to be formed. In the genus now noticed, as the branches arise in three, it has three such tags.

CHARADELLA.

Polypidom tree-like, branched; stem formed of numerous tubes, forming at the base an expanded mass of tubes; branches numerous, pinnate or bipinnate, formed of numerous articulations, each articulation throwing off, at its point of junction, two opposite branches formed of a single joint, each joint furnished on its upper edge with a series of small subequal tubular polype-cells.

1. CHARADELLA TRIFIDA.

B.M.

Pale brown; the branches furnished at the end with trifid tags, being the commencement of the branches in process of formation.

Hab. Australia, Portland (*Mrs. Maccloud*).

The coral form a bush 8 or 10 inches high.

The genus *Amathia* of Lamouroux and *Serialia* of Lamarck forms a very natural group, which may be divided into the following genera or subgenera.

I. *Cells simple, in a straight cluster on the joints.*

1. AMATHIA.

Coral creeping; stems rarely forked; joints filiform, the upper half covered with one or two series of cells, terminal joint or tag simple or rarely bifid.

1. AMATHIA LENDIGERA.

B.M.

2. AMATHELLA.

Coral arborescent, erect, repeatedly forked; joints short, rather incurved, covered with one or two series of cells; terminal joints or tags bifid.

* *Cells in two series.*

1. AMATHELLA BISERIALIS, Krauss.

B.M.

Hab. S. Africa.

** *Cells in one compressed series.*

2. AMATHELLA UNISERIALIS.

B.M.

3. CHARADELLA.

Coral arborescent, erect, repeatedly trifid; joints moderate, rather incurved, upper side covered with one or two series of cells; terminal joint or tag trifid.

C. TRIFIDA.

B.M.

Hab. Australia.

II. *Cells simple, disposed spirally on the articulations. Coral arborescent, forked.*

4. SERIALIA.

Coral arborescent, forked; articulation elongate, naked at the tail; cell-bearing above, subspiral; terminal joint bifid.

1. SERIALIA CONVOLUTA.

B.M.

Hab. Van Diemen's Land.

5. SPIRALIA.

Coral arborescent, forked; articulations short, covered with crowded cells, forming together a nearly continuous spiral series of cells on the stem; tags indistinct.

1. SPIRALIA SPIRALIS.

B.M.

2. SPIRALIA UNISPIRALIS.

S. unispiralis, Holdsworth, MSS.

III. *Cells with an elongated horny process on each side, and disposed spirally on the articulations.*

6. CORNALIA.

Coral arborescent, forked; articulations elongate, upper end with a crowded spiral series of cells, each armed with an elongated horny process on the side.

1. CORNALIA AUSTRALASIE.

B.M.

Hab. Van Diemen's Land.

In 1850 Mr. Francis Brent sent me a Coralloid from Western Australia, which is exceedingly peculiar in its character; for though it is evidently allied to *Flustra*, it is so unlike, both in substance and form, any that I have before seen, that I feel assured it must form a distinct genus.

The specimen is not in as good a state as I could wish, I therefore placed it on one side for a time in hope that I might procure other examples that might more completely illustrate its structure; but as they have not occurred, I am now induced to bring it before the Society.

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It may be thus described :—

LICHENELLA.

Coral frondose, erect, branched, hard, calcareous, and brittle; the stems and branches are convex on one side, and flat or rather concave on the other; the stem is broad and flat; the branches are narrow, with a more or less expanded thinner margin, which is dilated into broad foliaceous expansions at the tip, which are sometimes proliferous, giving out at the top a thin branch bearing an expanded tip.

The concave surface of the stem and branches are marked with the remains of squarish cells. The expanded ends of the branches are sometimes smooth on both sides; but generally they are marked externally with longitudinal grooves, and on the upper side furnished with longitudinal series of thin, rather calcareous, cells, which are each furnished with a regularly circumscribed roundish mouth closed by a thin membrane marked with a central longitudinal depression. The smooth surface of the coral under the microscope is marked with closed transverse punctated undulated cross lines.

This coral has much more the appearance of a *Lichen* than of a *Flustra*.

1. LICHENELLA BRENTII.

B.M.

Hab. W. Australia (*F. Brent, Esq.*, 1850).

The coraloid is so very like the calcareous *Alga* named *Mastophora Lamourouxii* by Descaine, from the same locality, that I am in doubt if it should be regarded as distinct from it. It differs from the usual specimens of that *Alga* in the leaf-like expansions being covered with cells on the upper surface, and longitudinally grooved on the under surface, the grooves forming the ridge between the cells on the upper side, while in the *Alga* both sides of the leafy expansions are smooth like *Pavonia*; but I must at the same time own that there are one or two of the expansions at the top of one or two of the branches that are smooth like the *Alga*.

Can it be a specimen of *Mastophora Lamourouxii* in which the form of the leaves is changed by a parasitical coral, which causes the leaves to be longitudinally radiately grooved?

9. A MONOGRAPH OF THE GENUS KERIVOULA.

By ROBERT F. TOMES.

(Mammalia, Pl. LXVI.)

The following monograph is one of a series which I have prepared, having for their object the definition of groups or genera rather than the description of the species of which they are composed. This has been done with a view to render less difficult the determination of the species, which difficulty is chiefly felt from the indiscriminate manner in which they are thrown together by some zoologists; the

descriptions of the species themselves being often quite sufficient, supposing that they had been more carefully divided into groups.

Two principal works which demand study in working out the species of *Vespertilionidæ*—Temminck's Monograph, and Wagner's Supplement to the work of Schreiber—are of this description. Whilst giving a pretty complete account of each species, the generic definition is, in consequence of the great disparity in the characters of the different species, necessarily so vague as to be nearly useless.

Scarcely more valuable to the investigator are lists of genera and species without accompanying descriptions, or having these so excessively brief as to be wholly unavailable in distinguishing species.

I have therefore, while bringing together species which fall easily under a generic definition, considered it advisable to add also a description of each, although they may have been before described, or be even well-known species.

By adopting this method I am enabled to give much more complete descriptions than have hitherto appeared, because they are of a more comparative nature, and are therefore more serviceable in the discrimination of allied species.

With regard to the synonymy of the several groups, it is as complete as I have been able to make it, but is I believe very imperfect. In all instances care has been taken to exclude such names and references as I could not either personally test by the examination of unquestionable species, or by the comparison of figures and descriptions agreeing with such accuracy as to leave no reasonable doubt as to their identity.

This explanation appeared necessary previous to bringing before the Society successive papers in which but very few of the species are new, and many old and well-known ones are described at some length.

The name of *Kerivoula* was first given by Boddaert* to a species of Bat which had before been described by Pallas† by the name of *Vespertilio pictus*—a name singularly appropriate for an animal with the bright red fur and membranes, and the peculiar distribution of the colour on the latter, which characterizes the species.

Boddaert's specific name having given way to that of Pallas, has been taken up by Dr. Gray‡, and used in a generic sense, he having perceived that the species differed considerably from most other representatives of the genus *Vespertilio*. But Dr. Gray, placing great reliance on the importance of a single character, has arranged with it some species, the affinity of which the subsequent examination of a greater number of species has not corroborated. In these investigations others have been discovered which bear very close generic resemblance to the original one, *V. pictus*, whilst some of those which have been associated with it prove, on the contrary, to be by no means closely affined.

* Elenchus Animalium, vol. i. sist. Quadrup. p. 70, No. 10, 1785.

† Spicilegia Zoologica, iii. p. 7, 1774.

‡ Annals and Mag. Nat. Hist. 1842, p. 258.

I have in a previous communication to the Society removed one of these species—*V. formosus*—from the present genus, and placed it in the group with the members of which its characters most closely agree. After describing the species which I consider referable to the genus *Kerivoula*, I shall enumerate such others as have been called by that name, but which I consider as appertaining to other groups.

Fam. VESPERTILIONIDÆ.

Genus KERIVOULA, Gray.

Vespertilio, Pallas, Geoffroy, Desmarest, Fischer, Schreiber, Wagner, Temminck.

The top of the head is very much elevated, but not so much so as in *Furipterus*, *Natalus*, and *Miniopterus*. The face is depressed; and the muzzle is of moderate length, and somewhat pointed. The nostrils, which are near together, open sublaterally, and have an emarginate space between them. The lower lip has a tolerably well defined naked triangular space in front. The ears are broad, with the outer margin so much developed near the base as to form a complete *lobulus*, which however is not separated from the upright part of the ear by a notch or hollow, as in some species. The ear may, indeed, be described as extending along the side of the face for some distance, and in a line with the corner of the mouth, not as a narrow strip of membrane, as in the generality of species, but ascending at once from its most anterior point, and forming what is called the ear-conch. Its inner margin is very convex, and curves off to the tip of the ear, which terminates in an angular point not very acute. In all the species there is a notch or hollow of more or less extent in the outer margin, *very near to the tip*.

The ear bears great resemblance to those of *Furipterus* and *Natalus*, especially to those of the latter. The tragus is long, nearly three-fourths the length of the ear, *excessively narrow and pointed*, and a little curved outwards. Its outer margin near the base is furnished with a projecting point or tooth.

The tail is rather long, in some species as long as the head and body. The wing-membranes extend to the base of the toes. The feet are of medium size; and the toes occupy a little more than half the length of the foot. The thumb also is moderate; and the basal phalange, which is enclosed in the membrane, is shorter than the remaining part.

The membranes and ears of all the species are more or less diaphanous, and rather conspicuously marked with glandular dots arranged, on the former, in lines.

The fur is of a fine woolly texture, in the Asiatic species without lustre; but in the African ones the hairs have shining tips.

The skull does not, as might have been expected, exhibit any of those peculiarities which are observable in the high-crowned genera, such as *Furipterus*, *Natalus*, and *Miniopterus*. In its general appearance it somewhat resembles those of *Vesp. mystacinus* and

Vesp. Nattereri, but the central region is much more inflated—indeed in the African species almost as much so as in *Furipterus*. Besides this point of difference, the following peculiarities require mention. The facial region is very much depressed, and also compressed; and the notch in the fore part of the palate is much deeper than in any other genus, but varies considerably in the different species. This appears to be due chiefly to the straightness of the intermaxillary bones, their development in a forward direction affording space for the incisors to range in a line with the other teeth, instead of being placed more or less across the opening between the two canines. This is best seen in the *K. picta*.

The bony palate extends nearly as far back as to the condyloid fossa, and narrows considerably after leaving the posterior boundary of the molar range. In no other Bat which I have examined has the palate extended further back than to the middle of the zygomatic arch.

Dentition.—In. $\frac{3-2}{6}$; Can. $\frac{1-1}{1-1}$; Premol. $\frac{3-3}{3-3}$; Mol. $\frac{3-3}{3-3} = \frac{18}{30}$.

The upper incisors are slender, conical, and pointed, with a slight accessory cusp behind the base; the anterior ones are the longer. The canines are long and pointed; and in most of the species the *cingulum* is amply developed. Between them and the incisors the interval is very small. The next two teeth are very simple in form, conical, and pointed. Following these is the *canassier* or sectorial tooth, in form as in the ordinary *Vespertilionidæ*; and the molars are of the ordinary form and proportions.

In the lower jaw the incisors are small and trilobed, those contiguous to the canines having their central lobe *very much developed, and of a blunt conical form*. The canines require no particular notice. Following these, the premolars present the appearance of three very regular and pointed cones, each with a small but distinct spur on its anterior and posterior surface near to the base. The molars are of the form so constant in the *Vespertilionidæ*.

1. KERIVOULA PICTA.

Vespertilio pictus, Pallas, Spicil. Zool. iii. p. 7, 1774; Erxl. Syst. p. 150, 1777; Linn. Syst. Nat. ed. Gmel. i. p. 49, 1788; Geoff. Ann. du Mus. viii. p. 199, pl. 48 (cranium), 1806; Desm. Mam. p. 141, 1820; Schreib. Säugth. Th. i. p. 170, 1826; Horsf. Zool. Research. Java, viii. p. 6, 1821–28; Fisch. Synop. Mam. p. 106, 1829; Temm. Mon. ii. p. 223, pl. 56. f. 1, 2, 3, 1835–41; Blasius, Wieg. Archiv, Bd. vi. p. 2, 1840; Wagn. Supp. Schreib. i. p. 517, 1840; Schinz, Synops. Mam. p. 174, 1844; Kelaart, Faun. Zeylan. p. 25, 1852.

Vespertilio (Kerivoula) pictus, Horsf. Cat. Mam. Mus. E. Ind. Comp. p. 40, 1851.

Pipistrellus pictus, Less. Nouv. Tab. Règne Anim. p. 29, 1842.

Kerivoula picta, Gray, Ann. and Mag. N. H. p. 258, 1842; Cat. Mam. B. M. p. 27, 1843; Kelaart, Faun. Zeylan. p. 25, 1852.

Although I have given to this species the most prominent position, I do not regard it as the most typical of the genus; but the generic name having been borrowed from it, it appeared desirable to mention it first, and those afterwards which are less known, but perhaps more characteristic.

The top of the head is very much elevated, but not quite so much so as in some of the other species of *Kerivoula*; and the muzzle is a good deal depressed, and of medium length.

All the face is very hairy, the fur of the forehead extending nearly to the end of the nose, and filling up the concavity of the face. The upper lips are furnished with fine longish hairs of the same texture as those of the rest of the body.

The ears, as already mentioned in the generic description, are broad, and when seen in front appear like two rather broad recesses, in the further end or bottom of which the tragus takes its origin. They are rather more pointed than in some others, owing to a shallow notch immediately below their tip, in the outer margin; and the inner margin becoming more convex as it approaches the tip, assists in giving to the latter an outward direction.

The tragus has been already described sufficiently.

The wing-membranes extend precisely to the base of the toes.

The tail is as long as the head and body, is composed of six joints, and has its tip enclosed in the membrane.

The fur of the back extends sparingly on to the interfemoral membrane, for half its length; and all its transverse lines are studded with very short and fine hairs, scarcely visible without the assistance of a lens. The upper surface of the tail itself, and of the legs and feet, are sparingly, but visibly, clothed with fine hairs, most conspicuously on the latter. The whole of the margin of the interfemoral membrane, inclusive of the *os calcis*, is fringed with fine hairs, those on the *os calcis* being adpressed and similar to those of the feet, whilst those on the edge of the membrane are projecting and bristle-like.

On no other part of the membranes does the fur of the body encroach; but that of the head extends for half the length of the ears, on their hinder surface.

The fur of the body is very fine, but without gloss, and nearly unicoloured. That of the upper parts is buff for two-thirds of its length, the remainder a bright and lively rust-colour. Beneath, it is uniform whitish buff, tinged with rust-colour on the humeral region and along the sides of the body.

All the bones of the limbs in the dried specimens are of a light yellowish-brown; and the interfemoral and interbrachial membranes are of the same colour. A part of the wing-membranes contiguous to the sides of the body, from the foot to the elbow, and from thence along the under side of the fore-arm to the wrist, is of a similar colour; and it passes from the wrist along each finger, margining it on each side, and leaving three triangular interspaces between the digits, of a deep chocolate-brown colour, which in many places is elaborately marked with dotted lines of the same light colour as that which accompanies the wing-bones.

The above description having been taken from dried specimens, I copy the following description of the colour of this species from the excellent account given of it by Dr. Kelaart in his 'Fauna Zeylanica.'

"Body above, yellowish ferruginous-brown, or, as artists would call it, yellowish crimson-brown. Below, fulvous whitish, with a dark yellowish tinge on the sides. Alar membranes black and bright yellow or citron-coloured. The former colour (black) confined to triangular spaces between the citron rays along the digits, and on a large triangular space between the last digit and body; the alar membrane adjoining the latter being also citron-coloured. Interfemoral membrane wholly citron-coloured; above and below the arms also, the same yellow colour prevails, as through the other parts of the membrane already mentioned." "Tips of toes brown, the rest yellow." "Ears yellow." "Sexes alike in colour."

As Dr. Kelaart is speaking of the species in its native country, and from personal observation when in a fresh state, the foregoing account is doubtless the correct one, and the comparatively dull colour which pervades all the specimens in our Museums is due to a change having taken place after preservation.

The following dimensions are taken, (1) from a Javanese specimen very kindly given to me by Dr. Horsfield, (2) from a specimen from Amboyna, and (3) from the specimen mentioned in Mr. Waterhouse's Catalogue of the Mammalia contained in the Museum of the Zoological Society, No. 138.

	1.	2.	3.
Length of the head and body, about ..	" 1 9	" 1 9	" 1 10
— of the tail	1 6	1 6	1 9
— of the head	0 7	0 7½	0 7½
— of the ears	0 6	0 5	0 5
Breadth of the ears	0 5	0 5	0 5
Length of the tragus	0 3½	0 3	0 3
— of the forearm.....	1 4	1 3½	1 4
— of the longest finger	2 11	2 10	3 0
— of the fourth finger	2 0	1 11½	2 1
— of the thumb	0 3	0 3	0 3
— of the tibia	0 7	0 7	0 7½
— of the foot and claws	0 4	0 3½	0 3½
— of the <i>os calcis</i>	0 6½	0 6	0 6½
Expanse of wings.....	10 6	10 0	11 0

Hab. The Continent of India; Ceylon; Java; Sumatra; Borneo.

2. KERIVOULA PAPILLOSA.

Vespertilio papillosus, Temm. Mon. de Mam. ii. p. 220, 1835-41; Wagn. Supp. Schreib. Säugth. i. p. 515, 1840; Schinz, Synops. Mam. i. p. 173, 1844; Blasius, Wieg. Archiv, Bd. vi. p. 2, 1840; Gray, Zool. Voy. Samar. no. 5. p. 10, 1849.

The present species, although not placed first on the list, is, I believe, quite as typical of the genus as the one preceding it. The top of the head is quite as much elevated as in that species; and the face is similarly depressed, and densely hairy; the nostrils, too, present precisely the same form and position. The ears are somewhat longer in relation to their breadth and to the size of the animal, than in *K. picta*, and have their points less acute and directed upwards, instead of outwards as they are in that species. They are thickly and conspicuously dotted with glandular dots. The tragus is fully two-thirds of the length of the ear, is narrow, and tapers evenly to a very acute point. It has a very slight outward curvature for its whole length, and has a projecting point on its outer edge, close to its base.

The body of the animal is small, and all the membranes very much developed, nearly as much so as in *Natalus*.

The thumb is rather long, and the basal phalange less than half its entire length; the feet are rather large, with the toes taking up half of their length, and the outer one a little shorter than the others, as it is also in *K. picta* and *K. Hardwickii*. The wing-membranes extend exactly to the base of the toes; and the *os calcis* is two-thirds of the length from the foot to the end of the tail.

The hair of the face presents some differences from that of the last species. In *K. picta* that which borders and fringes the lips is of the same peculiar soft and woolly texture as the rest of the fur of the head and face; that of *K. papillosa*, on the contrary, is strong and bristle-like. Over the eyes is a tuft which is nearly four lines in length, and is very straight; and above the nostrils is a similar fringe of straight strong hairs, whilst the upper lips are margined similarly with hairs which have a downward curvature and almost conceal the mouth when it is closed.

The upper surfaces of the ears are hairy only near the base; and the fur of the upper parts of the body does not encroach noticeably on to the wing-membranes; but the base of the interfemoral membrane is a little hairy, and fine short hairs are scattered along the upper surfaces of the tail, tibia, and feet. The free portion of the edge of the interfemoral membrane, between the *os calcis* and end of the tail, is also slightly fringed with fine short hairs.

The fur is fine and woolly in texture, and very long, that of an example in the Museum of the East India Company, from Calcutta, attaining as great a length as four lines on the dorsal region. It is bicoloured both above and beneath. On the whole of the upper parts it is dusky at the base for nearly two-thirds of its length, with the terminal third brown (nearly of the same tint as the back fur of *Vesp. Daubentonii*, but a little more tinged with rufous). Beneath, it is dusky at its base, tipped with yellowish-brown. Such is the colour of the specimen alluded to, presented to the Company's Museum by Mr. Pearson. A specimen in my own collection, taken in Ceylon by Mr. Thwaites, appears to exhibit the usual differences which exist between the animals of that island and the mainland of

India. It is smaller and darker in colour, but is otherwise similar to the Calcutta specimen. The membranes are of a medium brown colour, darker in the Ceylon specimen.

Dentition.—In. $\frac{2-2}{6}$; Can. $\frac{1-1}{1-1}$; Premol. $\frac{2-2}{3-3}$; Mol. $\frac{2-2}{3-3} = \frac{18}{20}$.

I can detect no difference in the position or proportions of the teeth in this species from those of *K. picta*.

No. 1 of the following table refers to the specimen from Calcutta, and No. 2 to the one from Ceylon.

	1.	2.
Length of the head and body	" "	" "
— of the tail	2 0	1 9
— of the head .....	...	0 7½
— of the ears .....	...	0 4½
— of the tragus .....	...	0 3½
— of the forearm	1 6½	1 4
— of the longest finger	2 5	1 10
— of the fourth finger	2 3	1 11
— of the thumb .....	...	0 3½
— of the tibia	0 9½	0 8
— of the foot and claws	0 4	0 4
— of the <i>os calcis</i> .....	...	0 6
Expanse of wings .....	...	10 0

Hab. India; Ceylon; Java, and Sumatra.

3. *KERIVOULA HARDWICKII*.

Vespertilio Hardwickii, Horsf. Zool. Research. Java, no. 8, 1821–28; Cat. Mamm. E. Ind. Comp. Mus. p. 39, 1851; Temm. Mon. ii. p. 222, 1835–41; Wagn. Supp. Schreib. Säugth. i. p. 516, 1840; Blasius, Wieg. Archiv, Bd. vi. p. 2, 1840; Schinz, Synops. Mamm. i. p. 173, 1844.

Kerivoula Hardwickii, Gray, Ann. Mag. N. H. x. p. 258, 1842; Cat. Mamm. B. M. p. 27, 1843; Zool. Voy. Samar. no. 5. p. 7, 1849.

Vespertilio pellucidus, Waterh. Proc. Zool. Soc. pt. xiii. p. 3 et 6, 1845.

Vespertilio? pellucidus, Gray, Zool. Voy. Samar. no. 5. p. 7, 1849.

The following description has been taken from the original specimens in the Museum of the East India Company and in the British Museum, and from the one which furnished the description of *V. pellucidus* of Mr. Waterhouse, now also in the National Collection.

The examination and comparison of these has proved beyond question the identity of the latter species with *K. Hardwickii*. As the Javanese specimens are preserved in skin, and the one from the Philippines in spirit, they may be supposed, taken together, to furnish a tolerably accurate description of the species.

The elevated form of the head, the concavity of the face, and the shape of the muzzle and nostrils are so much like the same parts in

K. picta and *K. papillosa*, as to require no further mention. The ears, although in general form very similar to those of the former of these species, differ in being a little longer, and in having their tips less acute and not so much directed outwards; in fact, they very closely resemble those of *K. papillosa*, and, as in that species, are thickly studded with glandular dots. The tragus is nearly two-thirds of the length of the ear, is narrow, excessively acute, and curved outwards in the dried specimens, but perfectly straight in the one in spirit.

The wing-membranes extend a little further than the base of the toes, almost to the middle of the outer one, which however is shorter than the others, and consequently the membrane does not reach as far as to the middle of the other toes, which may be said to constitute the foot. These remaining toes are of equal length, and are about half the entire length of the foot, which is rather large in relation to the size of the animal. The *os calcis* is long, and occupies two-thirds of the distance between the foot and end of the tail. The interfemoral membrane has about 18 or 19 transverse dotted lines.

The fur of the upper part of the body extends on to the wing-membranes for a little distance, and on to the interfemoral membrane in a similar manner. Beneath, the fur encroaches on the membrane similarly, but in a less degree. The upper surfaces of the tibiae are fringed with fine bristly hairs; and the dots on the interfemoral membrane have each a bunch of very fine short bristles on the upper surfaces, and the glandular dots of the ears are similarly provided on their hinder surfaces. Also the free portion of the interfemoral membrane, between the *os calcis* and tail, is fringed with fine short hairs.

The fur is long, very fine and woolly; that of the upper parts of the body is grey at the base, which is succeeded by pale brown, and tipped with a slightly darker tint of the same colour. These shades are not sufficiently distinct to give a tricoloured appearance to the fur, the general appearance of which is buffy-brown. This is the colour of the type-specimen, which has probably faded considerably. That of the specimen in spirit appears (as far as can be seen of the colours in spirit) to be of a reddish cinnamon-brown colour.

The membranes and ears are of a pale reddish-brown colour, and translucent. "I could," says Mr. Waterhouse, "read this writing through the wing-membranes, moistened as they were with the spirit, at a distance of more than a quarter of an inch."

The dentition, according to Mr. Waterhouse, is—In. $\frac{2-2}{6}$; Can. $\frac{1-1}{1-1}$. The molars have not been examined.

The two inner upper incisors are, as in *K. picta* and *K. papillosa*, in advance of the others, long, curved, and pointed; whilst the outer two are placed considerably behind them, and are smaller.

Those of the lower jaw are trilobed and small.

The following dimensions have been taken (1) from the original specimen of *V. Hardwickii*, and (2) from the type specimen of *V.*

pellucidus. Those of the second column will appear at first sight to differ a good deal from those of the first, but probably the latter may be considerably altered from its real size by the state of preservation. Such parts as could not be altered by this means, as the bones of the wings, do not differ materially, as may at once be seen by reference to the table.

	1.		2.	
Length of the head and body	1	3	1	9
— of the tail	1	4	1	11
— of the head	0	6	0	8
— of the ears .....	....		0	7
Breadth of the ears .....	....		0	6
Length of the tragus .....	....		0	4
— of the forearm	1	2½	1	3
— of the longest finger	2	8	2	10½
— of the fourth finger	1	9	2	1
— of the thumb	0	3	0	3½
— of the tibia	0	7	0	7
— of the foot and claws	0	4	0	4
— of the <i>os calcis</i>	0	5½		
Expanse of wings	9	6	10	6

Hab. Java ; Philippine Islands.

4. KERIVOULA LANOSA.

Vespertilio lanosus, Smith, Ill. Zool. S. Africa, pl. 50.

This species presents precisely the same generic peculiarities which characterize the foregoing ; and they are quite as typically developed. It possesses the same elevated crown and small muzzle, and has ears and tragi of a similar shape, the differences being such only as are purely specific ; but these differences, taken in the latter sense, are very conspicuous. Whilst the fur is relatively as long as that noticed of *K. papillosa*, it is, in addition to that, very thick and curly, with the tips very glossy.

But it is necessary first to notice some other slight differences which exist in the form of the ears and the distribution of the fur. The ears, although of the same general form as those of *K. picta* and the other species here treated of, yet differ in being more deeply notched externally towards the tip.

The tragus is of the same tapering and pointed form observable in the other species.

The face is very hairy, in some examples excessively so, the fur of the forehead almost concealing the ears ; and it is of the same soft quality as that on the top of the head and on the back, a small quantity only in front of the eye assuming a more bristly appearance. The ears have their hinder surfaces clothed with hairs, and when seen from behind are scarcely visible. The fur of the back does not encroach on the membranes of the wings, but extends on to the base of the interfemoral membrane for nearly half its length,

and, thinning out, leaves the hinder half naked. The upper surfaces of the tail, feet, tibiae, forearms, and thumbs and index-fingers are garnished with short and shining hairs of a silvery or pale golden-yellow colour.

The hinder margin of the interfemoral membrane, between the *os calcis* and tail, is furnished with a very remarkable comb-like fringe of prominent thick-set hairs, which, curving downwards, have their points directed towards the belly of the animal. On all the upper parts the fur is tricoloured, with a faint indication of a fourth colour. At the root it is blackish-grey for nearly half its length, which is succeeded by palish-brown, and this again for a very short length of a darker tint, and finally tipped with sulphur-yellow. The latter colour is on the head, neck, and shoulders so pale as to give a silvery appearance to the tips of the hairs, which is heightened by their being curly, somewhat as in the fur of the common hare. Towards the hinder parts they are less curly, and more yellow in colour, especially those which grow on the legs, tail, and interfemoral membrane. The same may be said of those on the upper surface of the forearms, thumbs, and index-fingers.

Beneath, the fur is bicoloured, dark at the base, with the terminal fourth whitish-grey, very much as in the common *Vespertilio mystacinus*; but the light-coloured tips are more shining than in that species.

The membranes are of a medium brown colour, somewhat diaphanous, and have their veins thickly marked with glandular-looking dots.

The description of the cranium will be given in connexion with that of the skull of the next species, the better to illustrate by immediate comparison the difference between the two.

In the following table of dimensions, the first column are those of a male and the second those of a female, both from the same locality:—

	1.		2.	
	"	"	"	"
Length of the head and body, about. .	1	9	2	0
— of the tail	1	7	1	6
— of the head	0	7	0	7
— of the ears	0	4½	0	5
Breadth of the ears	0	5	0	5
Length of the tragus	0	3½	0	3½
— of the forearm	1	2½	1	2½
— of the longest finger	2	9	2	9
— of the fourth finger	1	11	1	10½
— of the thumb	0	3	0	3
— of the tibia	0	6	0	6
— of the foot and claws	0	3½	0	3½
— of the <i>os calcis</i>	0	9	0	8
Expanse of wings	10	0	10	3

Hab. South Africa, the eastern coast.

5. *KERIVOULA AROSA*, n. s.

This species, from the same locality as the last, resembles it in the long and curly nature of the fur, but is larger and differently coloured. The ears, too, are larger, with the ends more rounded, and less deeply notched externally.

The top of the head, although much elevated, is scarcely so much so, relatively, as in *K. lanosa*, and the muzzle is proportionally longer; but the nostrils and snout are shaped as in that species. The ears have their ends rounded, quite as much so as in the *Notched Bat* and *Natterer's Bat* of Europe; and the hollow in the outer margin near to the end scarcely deserves the name of notch. It is in fact a mere indentation, shallow, but regular, and occupying nearly one-third of the outer margin. In all other respects the ears resemble those of the foregoing species, and indeed those of the other representatives of the genus. The *tragus* offers no deviation in form from that of the species already described; it is long, tapering, and pointed.

The membranes are similar to those of *K. lanosa*, excepting that they are not quite so distinctly marked with dotted lines as in that species.

The fur of the head is only of medium length, and does not obscure the ears, nor extend so far along the face as in *K. lanosa*. The face is in fact moderately hairy, with a woolly moustache on the upper lip, and a naked space between the eye and ear. The chin also is nearly naked.

On no part of the membrane does the fur of the back extend, and that of the under parts only to a very trifling extent on the base of the interfemoral membrane; but the upper surfaces of the legs, feet, and heel-cartilages, of the tail, forearms, thumbs, and index-fingers, and of the two terminal phalanges of the longest fingers, beyond the extremity of the index fingers, are more or less clothed with short adpressed shining hairs, thickest on the forearms and tail, but nowhere so thick as in the last species. The edge of the interfemoral membrane, between the heel-cartilage and tail, is sparingly furnished with short bristly hairs, very unlike the thick comb-like fringe of *K. lanosa*.

The fur of all the upper parts is long, thick, and curly, and nearly uniform in colour over the whole of the back, varying only in becoming a little darker towards the rump. It is of four colours,—dark grey-brown at the base for nearly half its length, succeeded by yellowish-brown, then by deep umber-brown, and tipped with shining bronzy yellow; that which is spread over the upper surface of the limbs, tail, &c. wholly of the latter colour.

Beneath, the fur is of a dark sepia-brown colour, tipped with brownish-bronze colour.

In no other Bat have I seen fur at all resembling that of the present species. It is not difficult to attain a tolerably correct idea of its general appearance, by supposing a small species with fur of the quality and texture of that of the common hare, but of a dark brown

colour, and with the light tips observable in the fur of that animal, changed to a shining golden-bronze colour.

	1.		2.	
Length of the head and body, about..	1	9	2	0
— of the tail	1	6	1	8
— of the head	0	8	0	8
— of the ears.....	0	5½	0	5½
Breadth of the ears	0	5½	0	6
Length of the tragus	0	4	0	4
— of the forearm	1	5	1	5
— of the longest finger	2	9	2	10
— of the fourth finger	2	1	2	1
— of the thumb.....	0	3½	0	4
— of the tibia	0	6½	0	6½
— of the foot and claws	0	4	0	4
— of the <i>os calcis</i>	0	7	0	7
Expanse of wings	10	6	10	6

Hab. South Africa, eastern coast, the same locality as the preceding species.

On comparing the skulls of three of the foregoing species, *K. picta*, *K. lanosa*, and *K. arosa*, I find their general form to be pretty similar, but yet presenting some slight modifications which require notice. Of these, *K. lanosa* has the cranium proportionally the shortest, and with the cerebral region most elevated, closely approaching *Furipterus* in this respect. It also has the facial portion more depressed, and the notch between the intermaxillary bones less deep than in *K. picta*; and these bones are not so much separated at their anterior extremities as in that species, so that the incisors which they bear are less separated also, and have an inward deviation from the line of the other teeth, contrary to what has been stated in the generic description. However, in this species, the upper incisors by no means approximate each other closely as they do in *Furipterus*. In other respects the crania of *K. picta* and *K. lanosa* do not differ materially; and the dentition is also so similar as to present scarcely any differences worthy of notice. The outer incisor in the lower jaw has precisely the same central elevated cusp already noticed, and is similar in both species; but the skull of the third species, *K. arosa*, has, on the contrary, the top of the skull less elevated than in *K. picta*, and the facial depression scarcely so deep, owing chiefly to the hinder extremities of the nasal bones having a somewhat inflated form. The facial portion of the skull is rather long in proportion to its entire length; and the bones of which it is composed are much thicker than in the other species, giving support to much longer and stronger teeth. Indeed the whole skull and teeth are much more substantial than the other and more typical species of the genus.

The lower jaw, with its teeth, is of proportionate strength, and is rather thick at the *symphysis menti*, where it has a slight descending process.

In number the teeth resemble those of the other species, but differ somewhat in their form. The outer lower incisors, although they have the central principal cusp already mentioned, yet have it so little developed that it would scarcely be regarded as singular if previous notice had not been called to it*. The upper incisors present a remarkable deviation from what appears typical: instead of two pairs of well-developed teeth, we find instead that the inner ones are long and pointed, but the outer ones merely rudimentary, so that they can scarcely be seen without the aid of a lens. The upper canines are long, strong, and angular; and the premolar next to them is also long and pointed. These differences in the teeth are alone sufficient to distinguish this species.

The following are the dimensions of the crania of these three species:—

	<i>K. picta.</i>	<i>K. lanosa.</i>	<i>K. arosa.</i>
	" "	" "	" "
Entire length of the skull exclusive of the incisors	0 7	0 6	
Greatest breadth across the zygomatic arches.....	0 4	0 3½	0 4½
Breadth of the skull behind the zygomatic arches.....	0 3½	0 3½	0 3½
Length from the posterior root of the zygoma to the anterior point of the intermaxillary bones	0 4½	0 4	0 5
Length of the zygomatic arches	0 2	0 2	0 2½
Length of the bony palate	0 3	0 2½	
Length of the dental series in the upper jaw	0 3½	0 2½	0 3
Breadth between the outer cusps of the two posterior molars.....	0 2½	0 2½	0 2½
Breadth between the tips of the upper canines	0 1½	0 1½	0 1½
Length of the lower jaw, exclusive of the incisors	0 5	0 4½	0 5½
Elevation of the condyle above the lower edge of the ramus.....	0 1½	0 1½	0 1½
Length of the dental series in the lower jaw.....	0 3½	0 3½	0 3½

The following species, having the wing-membranes attached as far along the foot as to the root of the toes, have been placed by Dr. Gray in this genus; but their similarity to the species of other genera,

* It is curious and interesting to note the very slight outward deviation from the more typical forms, exhibited by this species, and to find on examination that it possesses also an internal departure from the same typical standard; and it is satisfactory to find that these differences are such as accord well with each other, externally and internally. The slightly more bulky appearance of the animal, accompanied by membranes of less delicate nature, and more imperfectly marked with the veins and papillæ which are so characteristic of this and the allied genera, is associated with an osseous system of greater solidity, and with upper incisors which approach in their inequality of size those of many of the species of the robust genus *Scotophilus*. If we examine, for instance, the upper incisors of the *Noctule* or the *Hairy-armed Bat*, we shall perceive at once that the inner ones are much the largest, just as they are in *K. arosa*; and in those stout species of the genus *Vespertilio* which have a near affinity with *Scotophilus*, the same thing is observable.

or minor groups, has induced me to leave them out of the present monograph. *Kerivoula formosa* I have already separated from it, and placed in company with the *Vespertilio emarginatus* of Europe, and some other species. *K. Sykesii* is a small species, closely allied, if not identical, with *Scotophilus coromandelicus*; and *K. poensis* and *K. grisea* are both referable to the same subgeneric division of the genus *Scotophilus*, all having characters pretty similar to those of the *S. pipistrellus*, *S. Kuhlii*, and *S. marginatus*. *K. trilatoides* is a true *Vespertilio*, having the same generic forms as *Vesp. mystacinus*. *K. brasiliensis* I have not seen.

I have taken the occasion in a former monograph to give a few notes on the classification of some of the species of *Vespertilionidae*; and I seize the present opportunity of adding such others as bear on the same point, which have arisen during the examination of the species comprised in the present memoir.

The observations I made were something to this purpose,—that after eliminating such easily recognizable genera as *Plecotus* and *Barbastellus* from the genus *Vespertilio*, as given by M. Temminck, there yet remained a large number of species differing greatly from each other, but the most diverse of which were so connected by intermediate species as to be with great difficulty brought under generic definition. The common *Noctule Bat* and the *Whiskered Bat* were given as familiar examples of the desired genera, the first being considered as typical of the stout species which are organized for strong and rapid flight in exposed situations, and for capturing and masticating the larger species of Coleoptera; and the latter was given as an example of the light and comparatively fragile species which take their minute food amongst the foliage, or in other confined situations. But the *Whiskered Bat* is by no means the most typical of the slender species. The genera *Furipterus*, *Natalus*, and *Hyonycteris* are the most so, and *Kerivoula* immediately after them, and before *Vespertilio*, in which genus, in its restricted form, the *Whiskered Bat*, with many other species, takes its place.

Assuming that *Kerivoula* is a more typical genus than *Vespertilio*, we should expect its habits to be in accordance with its structure, and to differ somewhat from those of *Vespertilio*; and the following (all that I can gather which appears authentic) will throw some light on this point. In vol. xiv. of the 'Annals and Magazine of Natural History' the following notice of one of the species, *K. picta*, appears, from the pen of Capt. R. C. Tytler: "This elegant Bat is found in thick jungle, and is only observed when disturbed by suddenly flying out of its retreat and taking almost immediate shelter, like a moth, amongst the bushes." Dr. Kelaart, after observing that there are no Bats in Ceylon called "*Kerivoulha*," says "*Kehilvoul* is the Cingalese name for the yellow Bats found on plantain trees,—'*Kehil*' in Cingalese meaning plantain, and '*Voulha*' a bat. We have never obtained the *Kerivoulha* from any other places than plantain groves, where they are generally found clinging to the fruit."

From the observations of these gentlemen it would appear that

the *Kerivoula picta* is an arboreal species, certainly resting during the day among dense foliage, and more than probably taking its food in similar situations. It would be interesting to know if those which Dr. Kelaart has seen clinging to the plantain fruit had chosen that as a resting place, or were in search of insects which might feed on the fruit; for we cannot suppose that the Bats would be feeding on the latter: they are too purely insectivorous in their structure.

Of another species inhabiting South Africa, *K. lanosa*, Dr. A. Smith says that it frequents "a wooded district stretching along the sea-shore about 200 miles from Cape Town. Like other species of the genus, it appears as night sets in, and may then be seen flitting from spot to spot along the open spaces which exist here and there in different parts of the forest."

These short extracts comprise all that I can learn of the habits of the genus under consideration; but such as they are, they tend to corroborate my previous supposition, derived from observing the obvious similarity of the organs of flight to those of some of the *Rhinolophi*, one species of which I have observed in a state of nature.

When we look at the considerable development of the cutaneous system, and its delicate nature, and the ample organs of flight with their slender digits, in the genus *Kerivoula*, we can readily perceive that they are not well-suited for exposed flight, but that they would be admirably adapted for flitting amongst the boughs and leaves of trees; and the existence of numerous lines and papillæ, probably nerves of sensation, in the membranes, would render them highly delicate organs of touch, and a safe protection against the injuries which their slender members might otherwise sustain in such places. All the membranes of this and the allied genera *Furipterus*, *Natalus*, and *Hyonycteris* are elaborately veined and dotted, just as in the *Horse-shoe Bat*; and I have had a good opportunity of witnessing the extraordinary powers of flight of the latter.

On one occasion I had liberated from a box in my usual sitting-room a *Pipistrelle* and a *Lesser Horse-shoe Bat*. The former flew directly against the glass of the window, just as a bird does, and repeated the attempt to escape several times. The *Horse-shoe Bat*, instead of doing this, although it approached very near to the glass, never even so much as touched it with the tips of its wings; and I could distinctly see it pass in front of each pane so near as almost to touch it, but at the same time avoid the prominent wood-work of the window. Under and amongst the tables and chairs it passed with perfect ease, touching nothing, and behind the window curtains in a similar manner, although there was scarcely an inch of space between them and the wall. At length, when flitting in front of some book-shelves from which I had just removed an octavo volume (Temminck's *Birds of Europe*), it seemed, if I may use the expression, to *feel* the vacant space, and passed in and out again without, I believe, even so much as touching the volumes on either side.

Mr. Blyth has observed of *Natterer's Bat* that it occasionally "flapped against a glass case" while flying round a room. I have

often seen various species of *Vespertilionidæ* do the like against the walls and furniture of a room, but have never seen the *Horse-shoe Bat* do so.

Now, although speculation in zoological science is scarcely admissible, yet I am tempted to suggest, from the general similarity of the organs of flight in the genera *Furipterus*, *Natalus*, *Hyonycteris*, and *Kerivoula* with those of *Rhinolophus*, that they may have precisely the same function to perform; and I should entertain but little doubt of this, were not the latter provided with very singular cutaneous expansions, as nose-leaves and facial crests. These have by some observers been considered as organs of touch, performing in fact the office of eyes. But this latter suggestion is at best a mere suggestion, since we find amongst the *Rhinolophidæ* some species which, while they possess all the other peculiarities of *Rhinolophus*, are destitute of what may properly be called a nose-leaf, having in its stead grooves and hollows not likely to be highly sensitive organs of touch. This is the case with *Rh. aurantius* of Australia, and with *Nycteris*, which is simply a modified *Rhinolophus*.

Without further pursuing these suggestions, I may state my belief that it is in the *whole expansion of the cutaneous system* that the singular sense with which these animals are endowed exists, and that this, if properly investigated, will afford one of the most certain indices to the natural classification of the *Vespertilionidæ*.

Before concluding, I wish to add a suggestion relative to the probable habits of *Hyonycteris*, derived from the examination of specimens. As the creature is destitute of claws to the feet, which could be used as instruments of support, and has suckorial disks instead, it appears probable that it would be capable of traversing such surfaces only as were sufficiently even for the action of the disks, and that suitable surfaces might be furnished by the fruit or leaves of many of the trees of tropical America, from which the pig-like snout of the animal would be well adapted for taking minute insects, in a state of rest.

June 22, 1858.

Dr. Gray, F.R.S., V.P., in the Chair.

The following papers were read :—

1. ON THE SYSTEMATIC ARRANGEMENT OF THE TAILLESS BATRACHIANS AND THE STRUCTURE OF RHINOPHRYNUS DORSALIS. BY DR. ALBERT GÜNTHER.

The organ which in the tailless Batrachians offers the most remarkable character, and which is most closely connected with the mode of their life, is the *tongue*. Wagler has already separated from the other *Ranidae* a group without tongue, *Aglossæ*, comprising all other *Ranidae* under the name *Phaneroglossæ*, which have a tongue entirely adherent in front. This division was also afterwards accepted by Bibron, who changed the name of *Aglossæ* into that of *Phrynoglossæ*. The separation of the first group appears the more justifiable, as Müller came to the same result by another principle. I now add a third form, hitherto very imperfectly known, and the tongue of which is not yet described. *Rhinophrynus dorsalis* is the only Batrachian which has a tongue free in front, with the anterior tip capable of being stretched out of the mouth. The details are as follows :—The base of the cavity of the mouth is occupied by the tongue. The front part of this organ is rather narrow and cylindrical, with an obtuse rounded tip, of a similar shape to that of one of the small Rodentia; the front part is quite free; somewhat anterior to the middle of its length it is fixed to the base of the mouth by a frenulum; behind this it becomes gradually broader, and is fixed on each side by a muscular pad. The hinder edge is rounded, not notched, entirely adherent, and exhibiting only a transverse slightly prominent swelling. The tongue is entirely soft, with a velvet-like surface, covered with *papillæ filiformes*, which gradually become longer behind. And whereas the front tip of the tongue is again capable of being stretched out of the mouth, both halves of the *musculus genioglossus* are well developed, forming the very base of the cavity of the mouth.

I propose to divide the *Batrachia anura* into three groups :—

A. *Aglossa* : B. a. without tongue.

B. *Opisthoglossa* : B. a. with a tongue adherent in front, and more or less free behind.

C. *Proteroglossa* : B. a. with a tongue free in front and adherent behind.

We find by far the greatest development and the greatest variety of forms in the second group; and therefore I prefer to consider the principles of further division first in this group, hoping to obtain in this way points of view according to which we may characterize and

divide the few known forms of the other groups. Those characters which are generally considered as the most important, and which always command a separation of two Batrachians, are :—

1. The presence or absence of the maxillary teeth.
2. The dilated or cylindrical form of the transverse process or diapophysis of the sacral vertebra.
3. The dilated or not dilated tips of the fingers and toes.

When we consider that the lower jaw of the tailed Batrachians is provided with a series of teeth, and that these are wanting in the same bone of all the tailless Batrachians, we are obliged to acknowledge the importance of this character,—the more so as this difference is followed by a difference in the mode of life, as far as I have been enabled to observe it in European forms. In the former the *teeth* are the organs for seizing the food; in the latter, as well in those with maxillary teeth as in the toothless, it is the *tongue*. The former seize the prey in the same way as the Saurians do, and hold and press it with the teeth; the latter seize it with the clammy tongue, either filipping it out of the mouth as the frogs, or only turning it out, as the toads do, with broad and fixed tongue: the mechanism of seizing is the same as in *Myrmecophaga*, *Picus*, or *Chamaeleon*. On examining the recently swallowed animals out of the stomach of a lizard or newt, we shall find them always in a more or less dilacerated condition; whilst those taken from the stomach of a toothed or toothless frog or toad are constantly uninjured. This is even the case with *Ceratophrys* and *Cystignathus*, which are provided with the strongest dentition among all the Batrachians. The prey when seized is held and pressed by the tongue against the upper part of the cavity of the mouth; and though there are in a part of the species maxillary teeth, they appear to be entirely without function, and palatine teeth alone give assistance to this second part of the action. Therefore, not being able to consider the character of the dentition among the tailless Batrachians as one intimately connected with their mode of life, I think it right to subordinate it to another character which does correspond to this pretension. In a similar way the value of dentition is disregarded in the Edentata, which contain the toothless *Myrmecophaga* and *Manis*, and on the other hand the *Dasyurus gigas*, which exhibits more teeth than any other mammal except some Cetacea. So also the Salmonidæ contain the nearly toothless *Coregoni* and the strongly-armed *Salmones*, &c.

What influence the dilated or more cylindrical form of the process of sacral vertebra has upon the mode of life is difficult to explain, as it does not absolutely correspond with other physiological or anatomical characters. The pelvis obtains by the dilatation of these processes much more firmness; and a lateral motion is more or less entirely impeded. We should therefore expect to meet with this character in those Batrachians which are provided with the longest and most powerful hind legs, according to the physical problem, that the longest lever requires the strongest centre. But on the contrary, the Batrachians with the shortest legs exhibit a much-dilated sacral vertebra, whilst on the other hand the long-legged *Hylidæ*

show the same peculiarity. In fact, *this osteological form seems to be connected with none of the modifications of locomotion*; for we find among these Batrachians good swimmers as well as bad, tree- as well as earth-frogs, those which always hop as well as those which often crawl; finally we are unable to refer to it a peculiarity of any part of the propagation. Generally, I can only state—

1. *That all the Batrachia anura without maxillary teeth exhibit dilated processes of the sacral vertebræ, except the Hylaplesidæ*; but that, on the other hand, the *Batrachia anura* with maxillary teeth may have this bone sometimes dilated, and sometimes cylindrical in form.

2. *That all the Batrachia anura with paratoids exhibit dilated processes* (without any exception at present); but that, on the other hand, the *Batrachia anura* without paratoids have either this bone dilated or cylindrical in form.

From the above inquiries it is evident that I do not think this anatomical character fit for separating the whole group of the *Opisthoglossa*, so as to form two natural divisions; and there remains only the third of the above-mentioned characters,—*the dilated or not dilated tip of the fingers and toes*.

This natural character is connected with a strongly marked distinction in the mode of life, with *climbing trees*, which peculiarity is justly considered as one of the most important characters among the Vertebrata. No frog or toad without dilated toes is known to climb trees; and although our knowledge of the mode of life of the tropical forms is very limited, I have no doubt that the toothless Batrachians with dilated toes, of the tropics (*Hylaplesia*, *Hylædactylus*, *Brachymerus*, &c.), are enabled to climb trees, walls, &c., some being active during the day, others during the night. I am well aware that there are forms having the toes so slightly dilated that it is difficult to say to which part they belong; but in such instances the question will be decided either by observation of the living animals or by the more distinguishable form of closely allied species, as for example in the genus *Hylodes*. The objection to separate in this way the toothless Batrachians, which it was till now the custom to consider as a natural one, I get over by the fact that my two proposed series are parallel, and their members nearly corresponding; and I trust that at a not far distant time some of the wanting forms will be found. Therefore I divide the *Anura opisthoglossa* into two series:—

1. *Opisthoglossa oxydactyla*: *Opisthoglossa* with cylindrical or pointed tip of the fingers and toes.

2. *Opisthoglossa platydactyla*: *Opisthoglossa* with dilated tip of the fingers and toes.

Among the animals of both series we find that the same characters recur; and so we are enabled to apply in both series the same further division. I have already mentioned what value I am disposed to attribute to the dentition; and by co-ordinating with it the structure of the ear, I think we may obtain natural and scientifically-

established groups. Especially I think we can thus satisfy the long-felt necessity of separating the *Bombinator*es in a strictly circumscribed group. Now-a-days a group, defined as Tschudi does the *Bombinator*es, "*Body and extremities short, head rounder than in the Ranæ, skin generally warty,*" is not fit to form a part of the natural system. Husccke was the first who directed the attention of naturalists to a peculiarity in the ear of *Bombinator igneus*, stating, in the 'Beiträge zur Naturgeschichte und Physiologie,' p. 39, "Not much of a *cavum tympani* is to be seen in *Bufo igneus*, whereas muscles of the *ossicula auditus* appear to fill up the whole space." This information was not much enlarged by the inquiries of Geoffroy, Scarpa, and Windischmann; but Johannes Müller, having found a similar structure in the ear of the *Pelobates* of France (*P. cultripes*), with his anatomical ingenuity applied this character for a distribution of the Tailless Batrachians into three groups:—

1. *Anura* with an entirely bony *cavum tympani*, with a cartilaginous cover of this cavity instead of a membranaceous tympanum, with the Eustachian tubes united into a single aperture: *Dactylethra* and *Pipa*.

2. *Anura* with a partially membranaceous *cavum tympani*, with a membranaceous tympanum and the apertures of the Eustachian tubes separated: the greater part of the *Anura*.

3. *Anura* without tympanum, eustachian tubes, or *cavum tympani*, and with the cover of the fenestra ovalis cartilaginous: *Bombinator igneus* and *Pelobates cultripes*.

In rejecting this systematical arrangement of the *whole* suborder, I agree so far with Tschudi, not, however, "because the anatomist ought not to prescribe divisions to the zoologist," but rather because the Batrachians with imperfectly-developed ear would form together an unnatural group, and would be separated too far from other allied forms, if we tried to apply this character as that of a section. On the other hand, it is much more important than Tschudi supposes, because it proves to be of absolute value, as always indicating the *total absence of the tympanum*. Batrachians with well-developed ear exhibit sometimes a conspicuous, sometimes an indistinct, sometimes a hidden tympanum, which differences may offer in some cases a generic, in others only a specific character; even in many instances the appearance of the tympanum is variable in the individuals of the same species, being more or less conspicuous. The tympanum is *hidden* in those Batrachians where it is formed by a transparent membrane; but the skin of the body, not modified and not adherent, equally covers the tympanic region, and the tympanum becomes visible only after the skin is removed. The tympanum is *indistinct* in those Batrachians where the skin of the body is firmly adherent to the tympanum, covering more or less of its surface. But in all these Batrachians the tympanum is *present*; and it is a great mistake to confound the characters of a hidden and of an absent tympanum; and much trouble and much misunderstanding would be saved to naturalists, if a more precise mode of expression were introduced

into the descriptions. Secondly, we are obliged to acknowledge the value of the development of the ear in systematical arrangements, when we consider that this organ gradually returns to simplicity in the series of the Vertebrata, and that especially in the next class, of *Pisces*, it obtains systematical importance again. Therefore, though not accepting the structure of ear as the first principle for the division of those animals, I shall combine it with the dentition. Tschudi discredited Müller's observation, vindicating for all Anura Eustachian tubes and a cavum tympani, and only referring variations of the aperture of the Eustachian tube in the cavum tympani to the age of the individual (*Bombinator igneus*). Besides he mentions frequent examinations of the structure of the ear, according to which this organ, especially among the "*Bombinatoridae*," is liable to great variations, nearly in every genus, as regards the form and situation of the ossicula auditus, the chorda tympani, the tympanum, the tuba Eustachii, &c. It is a great pity that Tschudi never published these examinations; but in those which he has published I cannot quite agree with him.

The imperfect development of ear I have found or recognized in *Bombinator igneus*, *Pelobates fuscus* and *cultripes*, *Alsodes monticola* (Wiegmann in *Telmatobius peruvianus*), *Micrhyla achatina**, *Phrynisus nigricans*, *lævis* and *cruciger*, *Brachycephalus ephippium*, *Hemius guttatum* (*Engystoma guttatum*, Rapp.), and finally in *Rhinophrynus dorsalis*, which, although not belonging to the *Opisthoglossa*, may be mentioned on account of the structure of the ear. In all these Batrachians, tympanum and cavum tympani are entirely absent; the Eustachian tube either is entirely deficient, as I found it in *Phrynisus cruciger* and *Rhinophrynus* (and according to Müller's observations, perhaps in some specimens of *Bombinator igneus* and *Pelobates cultripes*), or it is only a blind tube without osteum tympanicum. Although I always found in some specimens of the same species the same development of the Eustachian tubes, I do not venture to contradict other observations, according to which these tubes were found more or less accessible; and Tschudi may be right in stating a variation to occur with the age. But such a variation as regards abolition certainly would not reach the cavum tympani or the tympanum; and therefore I hold to the truth of the fact that in the aforesaid Batrachians this part of the ear is wanting. In *Bombinator* and *Pelobates* I have always found the osteum pharyngeum of the Eustachian tube open. It is situated quite on the side of the pharynx, is very small and narrow, and accessible only to a thin bristle; the tube passes near the united os sphenoidum and petrosus inwards and towards the back, crossing the carotis and the nervus vagus. The membrane by which it is formed becomes gradually excessively thin, and is closed without an aperture near the fenestra ovalis vestibuli. This aperture is really oval, closed by a cartilaginous cover and in direct contact with muscles; the nature of the

* Cf. Tschudi's '*Batrachia*,' p. 14.

vestibulum is proved by the soft white calcareous concrement. Such I found to be the structure of ear in *Hemius guttatum* and *Micrhylla*. In *Phryniacus laevis* and *nigricans* and in *Brachycephalus* the osteum pharyngeum of the tube is more open. *Rhinophrynus dorsalis* exhibits the following details:—After removing the skin, an aperture of the ear is no more to be observed than a tympanum externally, the whole region being covered with muscles. The most accurate and repeated examination of old and young individuals did not enable me to find any osteum pharyngeum of the tube; there, where it might be supposed to be situated, on the sides of the palatum molle, I found only a very short and flat groove, perhaps the same seen by Bibron, who describes the Eustachian tubes as excessively small. After removing the muscles, the external entrance in the ear becomes conspicuous; it is the fenestra ovalis vestibuli,—a large opening with rounded outlines, formed by swollen edges of the os petrosum. This opening is closed by a cartilaginous operculum, internally concave, externally convex, and so inserted by a membrane in the bony ring as to be rendered moveable. Round the bony ring arise some muscular fibres, which continue to the front edge of the shoulder blade. Other muscular fibres, having arisen from the centre of the operculum, join them; and their function is, by moving the operculum outwards, to enlarge the cavity of the vestibulum. The vestibulum itself is spacious, quite bony, and forming an externally conspicuous, thin, flat *bullæ*. In the interior is enclosed in the saccum vestibuli,—a large, rounded, white and soft calcareous concrement. Besides the fenestra ovalis are to be observed 3–4 minute openings, through which a bristle can reach immediately the cavity of the skull, and a larger one, oval, near the canales semicirculares.

Thus we find in these *Anura* slight modifications in the type of the structure of the ear, as it is found in the *Cæciliæ* and *Urodela* (*Amphiuma*, *Menopoma*, *Siredon*, *Proteus*, *Triton*, *Salamandra*),—a circumstance, which directs us not to neglect it as a character for systematical arrangement; and thus I divide the *Opisthoglossa oxydactyla* and *platydactyla* into the following sections:—

I. *Opisthoglossa oxydactyla*.

1. With maxillary teeth and perfectly-developed ear: *Ranina*.
2. With maxillary teeth and imperfectly-developed ear: *Bombinatorina*.
3. Without maxillary teeth, and with imperfectly-developed ear: *Brachycephalina*.
4. Without maxillary teeth, and with perfectly-developed ear: *Bufonina*.

II. *Opisthoglossa platydactyla*.

1. With maxillary teeth and perfectly-developed ear: *Hylina*.
2. With maxillary teeth and imperfectly-developed ear: *Micrhylina*.

- (3. Without maxillary teeth, and with imperfectly-developed ear: *not known*.)
4. Without maxillary teeth, and with perfectly-developed ear: *Hylaplesina*.

For the division of these sections into families I use:—

1. *The absence or presence of paratoids.*
2. *The form of the diapophysis of sacral vertebra.*
3. *The absence or presence of a web between the toes.*

I consider the latter character as the most subordinate of the three, and I have used for the systematical arrangement only those aggregates of *cryptæ*, which are found on the shoulder and generally are called paratoids. Similar glandular aggregates are found on other parts of the body; and having had the opportunity of examining some new examples of such large glands, I think it useful to give an account of them in all the species.

In the genus *Pleurodema* a large gland is situated on the loins, in the males of *Pelobates* on the upper arm, in *Limnodynastes dorsalis** and *Bufo calamita* on the calves.

In other Batrachians the glands are situated on the shoulder, being either prominent and conspicuous, or hidden.

1. *Anura* with prominent paratoids are—*Alytes*, *Scaphiopus*, *Uperoleia*, *Bufo*, *Otilophus* and *Phyllomedusa*.

2. In other *Anura* the *cryptæ* are accumulated on the shoulder, but do not form a prominent gland, and the aggregate becomes visible only by an incision in the skin, the structure of the paratoid being the same: as in *Heleioporus*, *Pelodryas*, and *Rhinophrynus*. It is far more peculiar in *Kalophrynus*, which offers quite a smooth surface of the skin; and not only on the shoulders, but on the whole surface of the back, the skin is densely crowded with large *cryptæ*, together forming a large dorsal paratoid.

Having now gone through the most important characters upon which I base the division of the *Opisthoglossa*, I add the following tabular arrangement, which will show at once the families thus created, their natural relationship, and the parallelism of more remote families and characters of forms which may be discovered. The vertical divisions show their agreement in the anatomical, the horizontal ones in the zoological characters.

* In this species I have only had the opportunity of examining the males.

Maxillary teeth.				No maxillary teeth.			
Ear perfect.		Ear imperfect.		Ear imperfect.		Ear perfect.	
Sacral vertebra				Sacral vertebra			
Not dilated.		Dilated.		Dilated.		Not dilated.	
Ranidae	Discoglossidae	Bombinatoridae		Phryniacidae	Rhinodermatidae		.....
Cystignathidae	Asterophryidae			Brachycephalidae	Engystomatidae		
	Uperollidae				Bufoidea		
	Alytidae						
	Felodryadidae				.....	
	Phyllomedusidae						
Hylodidae	.....			.....	Brachymeridae		
Polypedatidae	Hylidae	Microhylidae		.....	Hylodactylidae		Hylaplenidae

Toes not dilated.				Toes dilated.			
No parrots.				Parrots.			
Toes webbed.		Toes free.		Toes webbed.		Toes free.	
Ranidae		Discoglossidae		Bombinatoridae			
Cystignathidae		Asterophryidae					
		Uperollidae					
		Alytidae					
		Felodryadidae					
		Phyllomedusidae					
Hylodidae		.....				
Polypedatidae		Hylidae		Microhylidae			

Both the series of *Opisthoglossa* are not to be considered as forming one continued series between the *Aglossa* and *Proteroglossa*; they do not form one series of animals, descending from the most highly organized form to the lowest one: such a gradation is equally found in both series; and one is at once struck with the identity of the characters in the single families, if brought side by side in two parallel series.

OPISTHOGLOSSA.

OXYDACTYLA.		PLATYDACTYLA.	
Ranina.	{ Ranidæ.	Polypedatidæ.	Hylina.
	{ Cystignathidæ.	Hylodidæ.	
	{ Discoglossidæ.	Hylidæ.	
	{ Asterophrydidæ.	.....
	{ Uperoliidæ.	Phyllomedusidæ.	
Bombinatorina.	{ Alytidæ.	Pelodyadidæ.	Micrhylina.
	{ Bombinatoridæ.	Micrhylidæ.	
Brachycephalina.	{ Phryniscidæ.	Hylaplesina.
	{ Brachycephalidæ.	.....
	{ Rhinodermatidæ.	Hylædactylidæ.	
Bufonina.	{ Engystomatidæ.	Brachymeridæ.	
	{ Bufonidæ.	.....
	{	Hylaplesidæ.	

I am always afraid of admitting teleological principles into natural science; the most important results of truth are gained by adhering to objective facts, and by inquiring into them. Each system should be adapted only to the present state of our knowledge of animals; but at last we must come to that point where analogies will enable us to look further, and the future will show (if it is allowed to presume so far) that, among the forms which hereafter may be discovered, there will be found correspondents to the *Asterophrydidæ*, *Phryniscidæ*, *Brachycephalidæ*, *Bufonidæ*, and *Hylaplesidæ*, viz. :—

1. *Hylina*, without paratoids, with dilated sacral vertebra and free toes.
2. *O. platydictyla*, without maxillary teeth and with imperfectly developed ear.
3. *Bufonina*, without paratoids, with not dilated sacral vertebra and webbed toes.
4. *Hylaplesina*, with paratoids, with dilated sacral vertebra, and webbed toes.

Only three genera are known belonging to the first group of *Anura*, to the *Aglossa*,—*Dactylethra*, *Pipa* and *Myobatrachus*, the latter of which is imperfectly known to myself from a short notice of Dr. Gray in the 'Proc. Zool. Soc.' All these three genera offer such characters as to become the types of as many families. But as I do not know whether the star-like configuration of the toes in *Pipa*, or the horny claws of the toes of *Dactylethra*, have the same functional importance as in the *Oxydictyla* and *Platydictyla*, or whether the two horizontal fangs in the intermaxillary bone of *Myobatrachus* are true teeth, or only apophyses (as in the lower jaw of *Tomopterna*), I am at a loss which of these characters must be subordinated to the

other; and therefore I refer first to the more-known structure of ear, and propose for the present the following division of this group:—

- I. *Aglossa* with united Eustachian tubes and entirely bony cavum tympani.
 - a. With maxillary teeth: *Dactylethridæ*.
 - b. Without maxillary teeth: *Pipidæ*.
- II. *Aglossa* with separated Eustachian tubes; cavum tympani?
 - a. With two horizontal fangs in the intermaxillary bone: *Myobatrachidæ*.

Finally, of the last group of PROTEROGLOSSA only one genus is known, forming the type of a family—*Rhinophrynidæ*, the complete characters of which would be—

Proteroglossa without maxillary teeth, with imperfectly developed ear, paratoids, dilated diapophysis of sacral vertebra, and webbed toes.

Bibron has given the only published description of *Rhinophrynus dorsalis*; but having had only a single specimen in an imperfect condition, he was not enabled to point out all its peculiarities. I therefore finish this paper with a full description of it.

The body being of an oval depressed shape, appears to be broader than it in reality is, because the skin is too wide for the circumference of body, forming on each side a broad longitudinal fold. It is rounded on all sides, the belly being rather more flat; the whole surface smooth, only on some places finely granulated. The head is confounded with the body, situated on the same level, and appears to be only the tapering front part of it; being somewhat depressed, it tapers conically, and ends suddenly with the obtuse, truncated top of the muzzle. The front part of the muzzle forms, if closed, a flat round disk, somewhat similar to the snout of a pig, but differing by being separated by the cleft of the mouth into an *upper smaller* and a *lower larger* half. The mouth itself is so peculiarly formed as to be unlike that of every other Batrachian. The cleft is situated in one plane, not on the lower side of the muzzle, but above the middle; and if the snout be imagined to be a truncated cone, the cleft splits it by a vertical cut going from the truncated plain to the base; the cleft therefore does not form a convex line, but three sides of the vertical cut of a truncated cone. Being of itself not small, and reaching nearly to the anterior angle of the eye, it does not allow a considerable widening of the mouth, as is necessary where a sling-tongue is present; and when we consider this configuration connected with the plump figure of the animal, we may conclude that its food consists only of small and slow animals. The nares are situated on the upper side of the head, at some distance from the end of the snout; they are formed by a small oval opening, surrounded by a low cutaneous fold, and can probably be closed. The eyes are situated but little further behind the nares, but rather more outwards; they are small, and placed behind a narrow cleft formed by the swollen external eyelids.

The posterior parts of the animal are very large and muscular. Just in the centre is the anus, situated in the upper end of a deep longitudinal furrow, which, formed by two thick cutaneous folds, extends along the lower part of the belly; probably it serves for conducting the products of generation. Each of the folds is in connexion with a broad muscle, destined for removing them one from the other; along the middle of the bottom of this furrow is a raphe, as in the perinæum of man. The extremities are short; and the single members are not conspicuous, on account of the wide and enveloping skin; the anterior ones are enveloped to the middle of the forearm. The fingers are four, quite free, ending in a blunt tip without being dilated; the thumb is the shortest, the second and fourth are nearly of equal length, the third much longer. There are callosities on the inner and outer side of the carpus. The hinder legs become more conspicuous from the articulation of the knee; the lower leg and tarsus are short; but notwithstanding the bluntness of the extremities, a free motion is allowed by the wide-folded skin. The planta is very broad; and the toes are joined by a web, which, deeply notched between the toes, reaches the extreme phalange as a narrow fold. The os cuneiforme forms a high, elongated, elliptical prominence, not as hard and sharp as in *Pelobates*, the integument of which may be separated from the bone together with the skin, and exhibits a surface with transverse grooves, a circumstance which affords a firmer hold when in locomotion. Immediately before this prominence is situated the rudiment of the first toe, modified into a perfectly similar and also striated but smaller prominence. This must support locomotion, the more as its surface is sometimes injured and lacerated. The four other toes end with a small round knot, the second being the shortest, the fourth the longest, the third intermediate between the second and fourth, the fifth rather longer than the second.

On the back, on the head, and round the snout, the skin is firmly adherent, all other parts being enveloped by it as by a too wide sac. It appears to be smooth on the back, but is pierced on all parts with innumerable minute pores. On the head appear scattered very small warts, becoming gradually more crowded towards the end of the snout; they are not glandular in structure, perhaps bearing organs of feeling. The disk-like end of the snout is entirely smooth, polished and soft, but of a firm structure. There are whitish prominences on the neck, the belly, and on the under sides of the legs; they obtain, especially on the latter place, the circumference of fig-seed, and are glands without ductus excretorius. There is externally nothing of a parotis to be seen; but by an incision is found a thick aggregate of glands, as above mentioned, situated above and behind the shoulder-blade, and of the same circumference as the skull: the ductus excretorii of the single glands are not different from those scattered on the other parts. In the subcutaneous tissue a black pigment is thickly deposited: the colour of the upper part is dark bluish-olive, either uniform or with yellowish spots along the vertebral line, sometimes confluent into a streak; spots of the same

colour are sometimes seen on the shoulder, and especially on the sides and on the upper parts of the extremities. The snout and the under parts are paler, and the disk of the snout is colourless.

The eye is protected by two external swollen eyelids, but the lower eyelid forms a double fold, the external of which is merely a fold of the cutis, the internal being transparent and representing an internal eyelid. There is no *membrana nictitans*; the pupil is round; the *lens* round, somewhat compressed; no *pecten*. The small size of the eye evidently shows that the animal is nocturnal.

There are no teeth; the edge of the jaws is obtuse and truncated, especially that of the lower jaw. Upon examination of the cavity of the mouth, it is found as spacious as the natural entrance is narrow. Behind the articulation of the mandibula, and on the side of the hinder insertion of the tongue, opens a large cavity, covered inside with a strongly-folded *mucosa*, and outside with a stratum of muscular fibres; the end of the bottom of this extends behind the head, and is situated near the insertion of the *musculus supraspinatus* at the shoulder-blade. Supposing this cavity to be a vocal sac, I do not think that it will be found in females; and it is a peculiarity of this animal that the vocal sac is covered by a muscular stratum, thus being quite separated from the skin; nor am I acquainted with any other instance in which the vocal sac reaches so far behind. The entire upper part of the cavity of the mouth is very concave, and covered by such a thin *mucosa* as to render the whole configuration of the bone transparent. Near the middle of the palate, and somewhat laterally, the inner nostrils are situated, being roundish-oval and of moderate size. The anterior part of the pharynx is separated from the hinder part by a cartilaginous transverse pad; and the latter part deserves the name of a *palatum molle*, inasmuch as it is provided with a soft body covered with a *mucosa*, as a similar one is found at the same place in the *Cyprinidae*. Between the tongue and *cartilago thyreoidea* is situated a spacious cavity, as is generally found in *Anura* beneath the tongue; it is quite closed. I think it is a *bursa mucosa*.

Concerning the *situation* of the intestines, the following is to be noticed. The heart is situated somewhat towards the right side of the medial line; and it is a highly interesting fact that it is surrounded by the liver in a similar way as in higher animals, as in other Batrachians it is surrounded by the lungs. The stomach is quite on the right hand, and partly covered by the left hepatic flap, separated from the heart only by a part of the peritoneum; it is on its left side. The right lung is behind the liver; the left lung is larger and is placed behind the liver and stomach. The situation of the other intestines is the same as is generally found in the *Anura*.

The *glottis* is a simple cleft; the *larynx* and *trachea* are conspicuously separated by a pair of excessively large, thick, and soft *ligamenta vocalia*. The larynx itself is very spacious, and forms nearly the cavity of a globe; the trachea is of a similar form, separated from the lungs only by a slightly produced fold of the *mucosa*. The *lungs* and the *vascular system* do not differ from those organs in

the other *Anura*, except in the situation, as mentioned above. There is a single ventriculus and two separated atria; from the former rises a very short bulbus arteriosus, the interior of which and of the other vessels could not be examined on account of their condition. The bulbus is soon divided into two strong stems, each of which emits three branches, ascending together for a short distance,—namely, an arteria pulmonalis, a carotis descendens, and a united stem of the a. cerebralis and a. lingualis. The right atrium receives the blood of the veins of the body; the left one that of two venæ pulmonales.

We find more peculiarities in the *tractus intestinalis*. The oesophagus is very strong, its circumference equal to that of the stomach; the mucosa is provided with very long villi, projecting nearly 1 mill. into the cavity; the next outer stratum is thick and of tendinous texture, thickest in the anterior and posterior medial line, and forming two very strong tendinous bands. These serve for the insertion of transverse muscular fibres, going from the anterior medial line to the posterior one, and forming two very strong constrictores, each surrounding one half of the oesophagus. If they co-operate, they then string the oesophagus as circular fibres would do; but by the separation into two parts the effect is rendered more powerful. The entrance from the oesophagus into the stomach is marked externally by the absence of the muscles, internally by the beginning of the mucosa ventriculi, which is deeply and longitudinally folded and wants the long villi. The stomach is short, ovoid, and gradually lost in the smaller intestines without pylorus; the latter are $3\frac{3}{4}$ as long as the body, and suddenly open into the excessively wide rectum. The *pancreas* is large, and joined with the intestine by a wide ductus Wirsungianus; about half an inch below the stomach three or four smaller branches open into the intestine, separated from the chief ductus; probably this is the place for the mouth of the ductus choledochus, which I could not find. The *liver* is large, and at the first glance it appears to be separated into a right half and a larger left one; but both parts are joined by a very narrow bridge, passing behind the heart: the left flap has a deep incision. Both flaps surround the heart, and the left one also the stomach. The gall-bladder is situated just in the medial line, beneath the uniting bridge, not in direct contact with the hepatic parenchyma, but fixed to it by the peritoneum; from each flap of the liver one ductus hepaticus opens separately into the bladder. The *organa uropoetica* do not offer any remarkable differences, at least not in the male. The testicles oval; kidneys elongate, cylindrical; corpora adiposa formed by long appendages; the bladder enters the cloaca on the anterior part, the urethræ on the posterior one.

The *osteological* peculiarities only consist in differences of form; and as far as they can be made out in a single coherent skeleton, they are the following. All the external bones of the skull are entirely ossified; the cranium is flat, depressed, very broad, without crest, and with a sharp not prominent lateral edge. The foramen jugulare is very large, but closed by a fibrous membrane pierced by

the nervus vagus and glossopharyngeus. The os petrosum is distinguished by a spheroid flat bulla ossea, which is quite different from that in some Mammals, being there the ossified cavum tympani, here a part of the vestibulum; it is very thin and transparent, so that the calcareous concrement may be seen. The upper part of the cranium is as broad as the os basilare is expanded; from the broad united ossa parietalia and frontalia suddenly projects a narrow long bone, situated between the nostrils, parallel with the ascendent processes of the intermaxillary bone, and nearly reaching the symphysis of the intermaxillary bones. This is formed by the frontalia anteriora; and there is in front a vestige of a suture, perhaps of formerly-separated nasal bones. The edge of the maxillary and intermaxillary bones is sharp; and the latter are provided with very long and narrow ascending processes. There are nine vertebræ, the second with hammer-like, the third and fourth with long cylindrical diapophyses; that of the sacral vertebra is moderately dilated, triangular, and flat, and joined with the ossa ilea by a much-developed cartilaginous symphysis. The scapula is not notched on the inner edge; the bones of the extremities are distinguished by their shortness and by the large size of their condyles. There is no processus xiphoideus.

The contents of the stomach consisted of a great many excessively small beetles, some lumps of earth, and small pieces of stick. I suppose that the animal catches those insects by stretching out the tongue, as some other animals do. In this action small particles of earth, &c. adhere to the tongue. The lumps of earth found were balled together only in the stomach, being too large to have passed the narrow cleft of the mouth*.

2. A FEW REMARKS ON THE HABIT AND ECONOMY OF THE
BROWN-CAPPED POMATORHINUS (P. RUFICEPS, HARTLAUB).
BY G. KREFFT.

The range of this bird does not appear to be a very extensive one; it was first discovered in the Polygonium Flats bordering the Murray River and its backwaters; but on the Darling they were not found so plentiful. Their favourite haunts are clusters of dead box timbers, and scrubby flats studded with salt bush, &c.

This bird is remarkably shy, and so cunning, that in almost all cases it will evade pursuit by running into some scrubby bush, and hide there till the danger is over. Its power of flight is exceedingly moderate, and closely resembles that of the brown Tree-creeper.

* M. Sallé, to whom science is indebted for the discovery of this strange animal, writes in a letter, "Je sais bien peu de choses sur le Rhinophrynus dorsalis; il vient des terres chaudes et tempérées de l'Etat de Vera Cruz; on le trouve dans la terre et assez profondément enfoncé, quelquefois à un pied ou deux; il paraît y vivre, il a des mouvements très lents et il est très mou, ce qui fait, que les indigènes le désignent dans des endroits sous le nom de *Sapo sin Aueros* (Crapaud sans os); je ne sais pas comment il peut s'enterrer ni de quoi il se nourrit."

These birds are always found in flocks of from four or five to twenty and more. They keep a good look out; and as soon as they suspect danger, they will rise with a sharp whirring noise, and seek shelter among the foliage of another tree, or run at a quick pace along the ground. They are very restless, and keep constantly moving up and down the branches and in the shade of the foliage; so that it is very difficult to obtain a shot at them.

Different kinds of insects appear to be their principal food, as I have found the remains of grasshoppers, &c. in their stomach.

Their nests are very remarkable structures, and about 30 to 36 in. long by 2 feet in circumference; the entrance is at the top, and protected by overhanging sticks. The whole fabric is very strongly constructed of dry branches, and at first appearance would never be taken to be the work of such a small bird. The inside of the nest is very small, consisting of a tunnel of about 14 or 15 in. in depth by 3 or 4 in. in diameter. The roof-like sticks covering the entrance are a good protection against the depredations of the spotted *Dasyurus* and other enemies to the eggs and young brood, showing the deep sagacity of this singular bird.

Travelling along the banks of the Murray, and now and then cutting off a bend of the river by crossing through the scrubble, the traveller cannot help noticing a great many of these nests buried between the forked branches of *Eucalyptus dumosa*, or into the very crown of the Huon pine. Whenever I asked my native companions to which birds these nests might belong, they would tell me their native name for it, which is Tannekun, but which left me as wise as before, as no Brown-capped Pomatorhinus was to be met with. It was not until Mr. Blandowski had returned to Melbourne, leaving me in charge of the expedition, that I was informed by that gentleman that this bird was not described by Mr. Gould, urging me to procure every information about its habits and economy; but very soon after this a splendid life-like representation appeared in the Supplement to the 'Birds of Australia.'

Measurements:—Weight hardly 2 oz.; between wings 11"; length 9½".

It was not so easy as I thought, to procure the eggs; and for two days I was unsuccessful—not one nest of more than a score which were searched contained any eggs; but on the 20th of September an inhabited nest was found in the top of a pine tree, which contained five fresh eggs of a light greenish-blue colour, with a few very indistinctly marked darker spots, and divided in the middle by a band paler than any other part of the egg.

When the nest was first seen there were about ten or fifteen birds hopping about it, by which and by the size of the nest I should suppose that more than one female deposits her eggs in it. The eggs which the natives brought in after this were almost all set upon: at the same time they brought some young birds; and about a fortnight later I shot several young birds on the wing.

July 13, 1858.

Dr. Gray, F.R.S., V.P., in the Chair.

The following papers were read :—

1. ON A NEW SPECIES OF PTARMIGAN. BY JOHN GOULD,
F.R.S., V.P.Z.S., ETC.

Everything which tends to increase our knowledge of so important a group of birds as the *Tetraonidæ* must be regarded with especial interest; and hence I have great pleasure in exhibiting to the meeting a skin, imperfect though it be, of what I believe to be a new species of this family. I may remark that, while many specific names have been given to some species of this group, others appear to have been passed over unnoticed, of which latter the bird now before us is an instance in point, for I believe that it has not as yet received a specific appellation. It is to be regretted that the specimen is not in a better state of preservation; it furnishes, however, sufficient materials for a good description. Its native habitat is Spitzbergen, where I believe it is plentiful. It was brought to this country by Edward Evans, Esq., of Neath, who shot it during a visit to that part of the world in the summer of 1856; the specimen, which is that of a female, is of course in its summer plumage, as at no other season are these high northern lands visited by travellers. In size it considerably exceeds our Common Ptarmigan, from which it differs very remarkably in the colouring of the tail; the basal half of nearly all the feathers being white and the apical half black, narrowly fringed with white at the extreme tips. As is the case with all other Ptarmigans in their summer plumage, the primaries are white; in this species most of the secondaries and the wing-coverts are also white; the remainder of the plumage is rayed with black and ochreous yellow, the black predominating on the upper surface, while the feathers of the flanks are beautifully and equally barred with these two colours; the feet are white, the nails jet-black, and the bill brown. The total length of the bird is about 16 inches, of its wing $8\frac{1}{2}$ inches, tail $5\frac{1}{2}$, tarsi $1\frac{1}{2}$. I propose to call this species *Lagopus hemileucurus*.

With much kindness Mr. Evans sent me the only skin he procured, accompanied by permission to describe and make any other use of it I pleased, and the following note respecting it :—

“The skin sent is the only one I have from Spitzbergen, though I shot many. The bird was so plentiful, that, thinking I could always procure examples, I neglected to preserve any at the time, and was obliged to come away at last with only this one. The hen birds had all assumed their summer plumage; but the males had not changed a feather, though the old ones, which had become very ragged and dirty, would almost fall off on being touched. I started one hen from her nest, or rather from the little dry hollow where

she had collected a few stems of grass, and found two eggs; these were all we met with; the nest was placed in the high fields where in the dry parts scarcely any vegetation is to be seen, while the swampy portions where the snow had melted were covered with coarse grass and the dwarf willow, which is the only thing approaching to a shrub on these barren treeless islands. The specimen sent was shot on the 27th of June on the south shore of Ia Sound in about $77\frac{1}{2}^{\circ}$ N. lat.

"The neighbouring country consisted of a belt of swampy ground covered with rank grass, with high, rugged, and barren mountains rising behind, covered with snow, except on their sharp ridges and steep sides; these mountains, which are interspersed with vast snow-clad plains, stretch away for miles inland, and rise into beautiful cones in the distance; here and there in a few sheltered spots a scanty supply of small flowers were to be found, mostly belonging to the following families: *Draba*, *Ranunculus*, *Saxifraga*, &c. The dark grey rocks were covered with lichens in great variety, but of a gloomy and sombre hue, in strict keeping with the wildness of the scene; here too the reindeer moss grew in great abundance. I may remark that the Ptarmigans were so tame, that we could easily have knocked them down with a long stick, doubtless from being so unaccustomed to the intrusion of human visitors."

I cannot conclude without expressing a hope that some person visiting the country, such as the noble Lord Dufferin, will think of our museums as well as of gratifying their palates, and send us specimens of this new species, which would be highly prized.

2. DESCRIPTIONS OF TWO NEW SPECIES OF THE FAMILY HIRUNIDINÆ. BY J. GOULD, F.R.S., V.P.Z.S., ETC.

One an *Atticora* from Guatemala, the other a *Chelidon* from Cashmere.

ATTICORA PILEATA, Gould.

Size of the Sand Martin (*Cotyle riparia*); crown of the head, ear-coverts, and back of the neck black, with bluish reflexions; back deep brown, becoming darker on the upper tail-coverts; wings blackish-brown, darkest on the shoulders; tail moderately forked, and of the same colour as the wing; throat mottled with dark brown and greyish-white; breast white, blending into brown on the flanks; under tail-coverts largely developed, and of a dark purplish-brown; bill and feet dark purplish-brown; thighs brown, gartered with white.

Total length, $5\frac{1}{2}$ inches; wing, $3\frac{3}{4}$; tail, $2\frac{1}{2}$; tarsi, $\frac{3}{4}$.

Hab. Guatemala.

Remark.—This bird is much smaller, but is of precisely the same form as the *Atticora fasciata*. Science is indebted to George Ure Skinner, Esq., for the introduction of this new and interesting Swallow.

CHELIDON CASHMERIENSIS, Gould.

Considerably smaller than the common species *Chelidon urbica*, but of precisely the same form and colour, except that the axillaries and under part of the shoulder are dark brown instead of greyish-white; the feathered tarsi occur in both species; crown of the head, back, and shoulders black, with steel-blue reflexions; tail brownish-black; throat, under surface, and rump white, stained with brown on the flanks.

Total length, $4\frac{5}{8}$ inches; wing, $3\frac{7}{8}$; tail, 2; tarsi, $1\frac{7}{8}$.

Hab. Cashmere.

Remark.—For our knowledge of this species we are indebted to Dr. A. Leith Adams of the 22nd Regiment; several of whose discoveries in ornithology have already been recorded.

3. DESCRIPTION OF A NEW SPECIES OF THE GENUS BUTEO FROM MEXICO. BY PHILIP LUTLEY SCLATER, M.A., F.L.S., ETC.

Mr. J. H. Gurney has requested my attention to a specimen of a species of the genus *Buteo* belonging to the Norwich Museum, which I now exhibit. It was formerly in the collection of this Society, and was originally received along with other birds from the State of Tamaulipas, in Northern Mexico, by Mr. Gould. I have never seen any other bird quite resembling it—the nearest ally known to me being the *Buteo albonotatus* of G. R. Gray; from which, however, on comparison, it appears to be perfectly distinct. I agree with Mr. Gurney in considering it as probably undescribed; and in allusion to its nearly uniform sooty black plumage, propose to characterize it as

BUTEO FULIGINOSUS, sp. nov.

Saturate fuliginoso-brunneus unicolor; capite, dorso medio et alarum primariis extus paulo nigricantioribus: primariorum et secundariorum vexillis internis subtus albis, sex aut septem vittis nigris transversim notatis; tectricibus alarum inferioribus nigro-brunneis: cauda supra fuliginoso-brunnea, vittis quinque aut sex nigris obsolete transfasciata et nigro late terminata; cauda subtus alba et vittis dilutioribus: rostro nigro, pedibus flavis.

Long. tota 15·5, alæ 12·0, caudæ 6·5, tarsi 2·6.

Hab. In Mexico Boreali.

This paper will be printed in the 'Transactions,' and illustrated with a plate.

4. LIST OF BIRDS COLLECTED BY GEO. CAVENDISH TAYLOR, ESQ., IN THE REPUBLIC OF HONDURAS. BY PHILIP LUTLEY SCLATER, M.A., F.L.S., ETC.

A small collection of Birds, some of which I now exhibit, was

made by my friend Mr. George Cavendish Taylor during his route across the Republic of Honduras in the beginning of the present year. Mr. Taylor landed in Fonseca Bay on the Pacific side, and pursued the route of the proposed "Honduras Inter-oceanic Railway" to Omoa, at the extremity of the Bay of Honduras on the Atlantic side. There is nothing of very striking novelty in the collection, though a Motmot (*Prionirhynchus carinatus*) and one of the blue Jays, allied to *Cyanocitta coronata*, are of much interest. But wherever localities are accurately marked on specimens (as is here the case), I think the knowledge of them is worth preservation; and I have therefore drawn up the subjoined list of the present collection.

1. *SPIZÆTUS TYRANNUS* (P. Max).

Near Potrerillos, Atlantic side.

2. *TINNUNCULUS SPARVERIUS* (L.).

Tigré Island, Bay of Fonseca.

3. *SCOPS TRICHOPSIS*, Wagler?

4. *NYCTIDROMUS* — ? —.

Tigré Island.

5. *NYCTIDROMUS* — ? —.

Tigré Island.

Two species of this difficult genus of *Caprimulgidæ*, which in the present state of our knowledge of the group it is impossible to determine accurately.

6. *TROGON MELANOCEPHALUS*, Gould, ♀?

Tigré Island.

7. *TROGON ELEGANS*, Gould, ♀.

Plain of Comayagua.

8. *GALBULA MELANOGENIA*, Sclater, Contr. Orn. 1852, p. 61, pl. 90.

Omoa.

9. *PRIONIRHYNCHUS CARINATUS* (Du Bus); Sclater, P. Z. S. 1857, p. 257. pl. 128.

"Near the Lake of Yojoa."

This bird agrees well with the Plate given in the Proceedings for last year. The figure was reduced from a copy of a plate originally intended for publication in the 'Esquisses Ornithologiques,' and kindly sent to me by the author of that work in reply to an application for information concerning this species. The present is the only example of the bird which I have yet seen. It has not yet occurred in the collections lately made in Western Guatemala by

Mr. Skinner, and I am inclined to think that the Atlantic slope of Honduras is more likely to prove its true habitat.

10. *AMAZILIUS CORALLIROSTRIS* (Bourc.) ; Gould, Mon. Troch. xiii. pl. 194.

Tigré Island.

11. *THAUMANTIAS CANDIDUS* (Bourc.) ; Bp. Consp. p. 78.

"Near Potrerillos."

Mr. Taylor states that these were the only two *Trochilidæ* he met with in the country.

12. *CERYLE AMERICANA* (Gm.).

"Lake of Yojoa."

13. *MYIIDIOTES MITRATUS* (Gm.).

Comayagua.

14. *MILVULUS TYRANNUS* (L.).

Lake of Yojoa.

15. *SCAPHORHYNCHUS MEXICANUS*, Lafr.

Tanlavi.

16. *SALTATOR ATRICEPS* (Less.).

Comayagua.

17. *PYRANGA ÆSTIVA* (L.), ♀.

Comayagua.

18. *TANAGRA ABBAS*, Licht. ; Sclater, Syn. Av. Tan. p. 61.

Lake of Yojoa.

19. *SPIZA CIRIS*, (L.).

Comayagua.

20. *STURNELLA LUDOVICIANA* (L.) ?

Equalling in size the true *ludoviciana* of the United States. In Mexico a smaller species (?) occurs, which is generally referred to Wagler's *S. hippocrepis*.

21. *QUISCALUS MACRURUS*, Sw. An. in Men. p. 299.

Comayagua.

22. *ICTERUS GULARIS* (Wagl.) ; Bp. Consp. p. 435.

Comayagua.

23. *CACICUS MONTEZUMÆ* (Less.), Cent. Zool. pl. 7.

Tanlavi, ♀.

24. *CALOCITTA BULLOCKII* (Wagl.).

Comayagua.

25. *CYANOCITTA CORONATA* (Sw.); Jard. & Selby, Ill. Orn. pl. 64?

Near Siguitepeque.

This bird agrees perfectly with an example in my own collection from Guatemala, which I have always considered to be Swainson's *Carrulus coronatus*. But on referring to the figure given in the 'Illustrations of Ornithology' and accompanying description, it appears that the head and crest of that species are of a "deep bluish black." Now the sides of the head of the present bird are certainly nearly black, but the crest is of a fine blue—not much darker than the back; and knowing well how closely allied some of the species in the family are, I should wish to compare it with Mexican specimens before I assign it unhesitatingly to *Cyanocitta coronata*.

26. *CYANOCORAX MELANOCYANEUS*, Hartlaub.

Near Siguitepeque.

27. *PICUS JARDINII*, Malherbe.

Near Tanlavi.

28. *CELEUS CASTANEUS* (Wagler).—*Picus castaneus*, Wagler, Isis, 1829, p. 515; *Celeus badioides*, Sclater, P. Z. S. 1857, p. 229. Potrerillos.29. *CENTURUS SANTACRUZI* (Bp.), ♀.

Comayagua.

30. *DRYOCOPUS GUATIMALENSIS*, Hartl. P. Z. S. 1857, p. 229.

Near Omoa.

31. *DRYOCOPUS SCAPULARIS* (Vig.).—*D. leucorhamphus*, Reichb. Handb. d. Sp. Orn. p. 393.

Island of Tigré.

32. *PTEROGLOSSUS TORQUATUS* (Wagl.); Gould, Mon. Trog. ed. 2. pl. 20.

Near Omoa.

33. *CHRYSTIS ALBIFRONS* (Sparm.).

Near S. Pedro.

34. *PIAYA MEXICANA* (Sw.); P. Z. S. 1857, p. 308.

Comayagua.

35. *CROTOPHAGA RUGIROSTRIS*, Sw.

Comayagua.

36. *CHAMÆPELIA RUFIPENNIS*. — *Talpacotia rufipennis*, Bp. Consp. ii. p. 79.

Comayagua.

37. *TIGRISOMA TIGRINUM*.

Tigré Island.

38. *PARRA GYMNOTOMA*. Wagler.
Tigré Island.

39. *DENDROCYGNA AUTUMNALIS* (L.).
"Lake of Yojoa."

5. ON THE GENUS *SYNAPTA*. BY S. P. WOODWARD AND LUCAS
BARRETT. (COMMUNICATED BY J. S. GASKOIN, ESQ.)

(Radiata, Pl. XIV.)

The marine animals allied to the Sea Cucumbers, forming the genus *Synapta*, possess a peculiar interest for that large class of persons who study Natural History with the microscope, because they afford the miniature *Anchors*, of which a hundred may be shown in the field of the "inch object-glass," and thousands sometimes exist in the space of a square inch—each elegant in form and perfectly finished, and articulated to an anchor-plate whose pattern (as well as that of the anchor itself) is characteristic of the species to which it belongs.

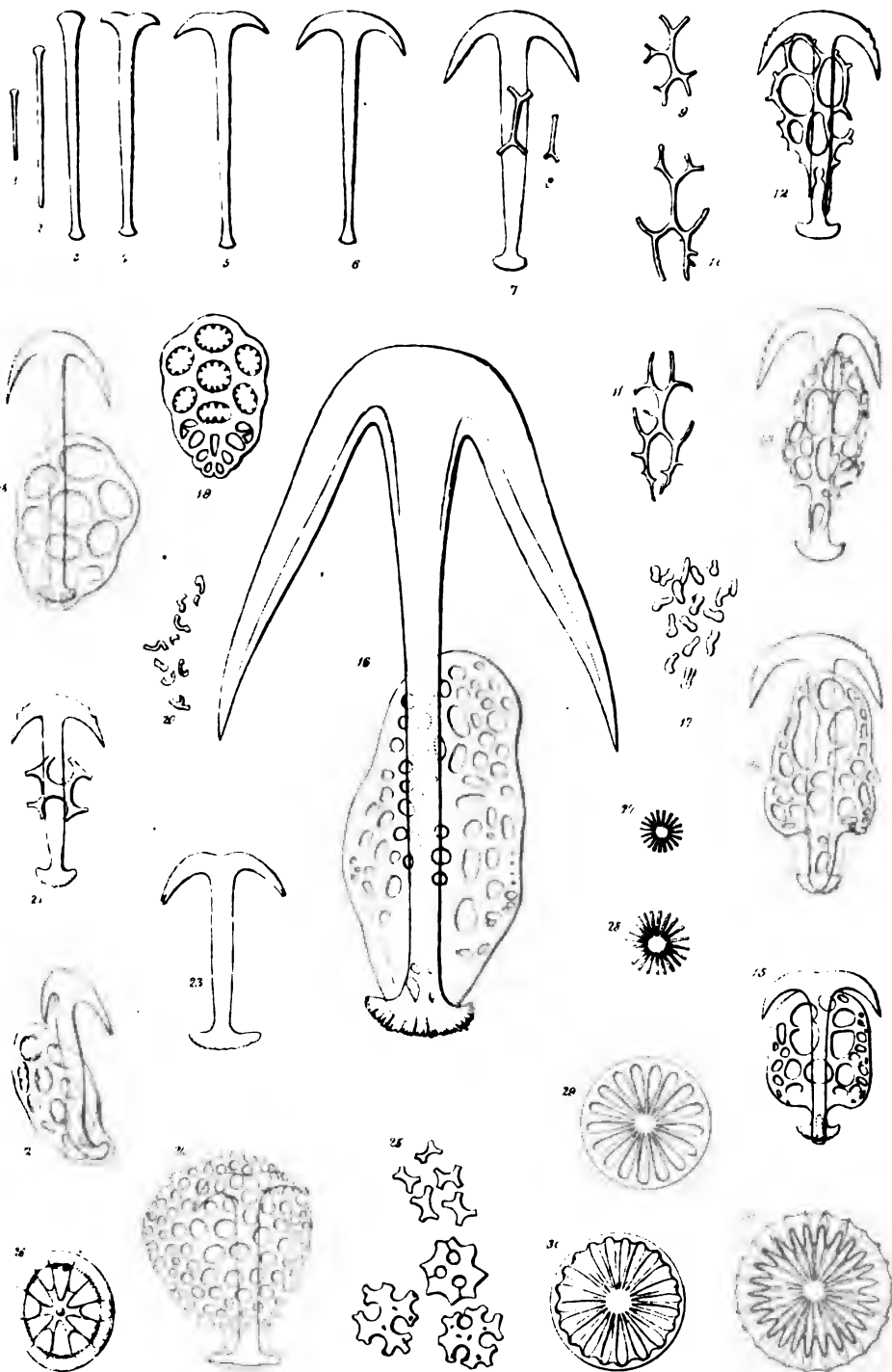
Curiously enough, these anchors were unknown to all the earlier writers, and most of the moderns. Forskål, who had the merit of describing two species of *Synapta* so long ago as 1775, remarked that they "adhered to the finger by glutinous papillæ invisible to the eye." O. F. Müller called the Northern species *Holothuria in-hærens* for the same reason. And Eschscholtz, who met with several species at Tahiti and on the coast of Russian America, concluded that they ought "to form a class apart, not having tubular feet, but adhering, by means of their sharp skin, to extraneous objects, on which account they might be called *Synapta* *."

Only five years ago (in 1853) Mr. Cocks of Falmouth described two British species, and gave a magnified figure of the skin without seeing the anchors. And still more recently Mr. Gosse was unable to find them, even with the aid of a microscope †. However, they are present in all the examples that have come under our notice, and they can always be seen with a common pocket lens. Indeed the larger anchors of *Synapta digitata* are nearly half a line in length, and visible to the unassisted eye.

Jæger says that all the anchors of his *Synapta Beselii* are $\frac{1}{3}$ rd of a line in length, and can be seen without a glass. This great *Synapta*

* Appendix to Kotzebue's Second Voyage, 8vo, Lond. 1830, p. 338. Van der Hoeven makes Eschscholtz say the *Synapta* adheres "by means of small hook-lets;" but this expression (der sie überall wie Kletten anhängen) is employed in the introductory paragraph. In the special description of *Synapta* he only speaks of "small roughnesses (Rauhigkeiten) invisible to the naked eye." And he describes *Chiridota verrucosa* as, "corpore undique verrucis rubris adhærentibus obsito."—Zool. Atlas, fol. Berlin, 1829.

† Aquarium, p. 243.



Species of Synapta & Chiridota

- 1-7 Synapta digitata 18-22 Synapta imbricata 23-25 S. bidentata
26 Chiridota laevis 27-31 Myriotrechus Runkli

of the Celebes is a yard long, and called a "sea-serpent" by the natives! *

Two other large species, described by Lesson, were said to create a burning sensation when handled; but it is not clear whether this was caused by the anchors, or by urticating organs, like those of the *Actinia* and *Æolis*. No such phenomenon could be detected by Quatrefages or other observers who have handled the smaller *Synapta* when alive.

The anatomy of these creatures appears to have been first investigated by Leuckhart †, who examined the *Synapta vittata* of Forskål, and ascertained that it had no internal respiratory organs like the *Holothuria*.

Anchors and plates attributed to this species, which comes from the shores of the Red Sea, near Suez, are to be found in the cabinet of every microscopic observer. The slides are prepared in Paris, and extensively re-manufactured in this country. The anchor-flukes are plain and simple, and the articular end of the shank is deeply subdivided. The plates are furnished with a raised arch at the smaller end, forming a sort of cavity for the reception of the anchor-stock. They are exactly like those figured in Müller's article, "Über den Bau der Echinodermen" (Berlin Trans. 1854, t. 6. f. 17), under the name of *S. serpentina*. There is a woodcut of them in Carpenter's work on the Microscope; and figures are also given in the Micrographic Dictionary. Mr. Wm. Griesbach has a *slide* with the miliary plates, which are oval and granular, very numerous, and all alike.

Prof. Forbes was unacquainted with the anchors of the British *Synapta*, and Dr. Carpenter in his last work (1857) says it is not known whether they have anchors, or wheels like *Chiridota*.

We have obtained evidence of both the European *Synapta* from several British localities; and as the published notices are scattered in many works, we propose to give some account of them, with figures of their spicula, and also to describe a new species from China.

1. *SYNAPTA DIGITATA* (HOLOTHURIA), Montagu. (Pl. XIV. figs. 1-17.)

The earliest account of this species appears to have been given by Montagu ‡, who discovered it on the coast of Devonshire, and correctly observed its affinity with the *Holothuria inharens* of the Zoologia Danica, but pointed out its characteristic difference by the epithet "digitata." It has four fingers to each of the twelve tentacles, and a minute thumb which has been overlooked by all observers except J. Müller. It was again found, prior to 1818, by Cranch (the Naturalist to the Congo Expedition), whose specimens are preserved in the British Museum§. In 1844 Mr. Joshua Alder discovered it on the west coast of Scotland, the most northern lo-

* Dissertatio de Holothuriis, 4to. Turic. 1833.

† Isis, 1831.

‡ Linn. Trans. xi. p. 22. t. 4. f. 6.

§ Gray, Catalogue of British Radiata, p. 12.

cality yet known. He says in a letter :—"I dredged the true *digitata* of Montagu in Rothsay Bay in 1844. At that time I could have got any number of specimens, though it was confined pretty nearly to one spot in shallow water. They broke themselves up so that it was impossible to keep them entire; I, however, made a drawing of one at the time, which I now send for your inspection." Mr. Alder further states that he had received specimens from Mr. Barlee, dredged in Birterbuy Bay and at the Arran Isles, on the west coast of Ireland.

In 1845 Mr. Alder again met with this species in Torbay; and in January 1854 the Rev. Charles Kingsley "collected many living specimens on the beach, near Torquay, washed ashore after a heavy gale."

In the 'Contributions to the Fauna of Falmouth' for 1853, by Mr. W. P. Cocks, this *Synapta* is figured and described, but not very minutely. "The specimens procured measured from $2\frac{1}{4}$ to $4\frac{1}{2}$ inches in length, and about $\frac{1}{4}$ inch in diameter. Found in the blue mud and sand, Helford; plentiful in particular localities; Falmouth, very rare."

The *Synapta digitata* ranges southward to the Mediterranean, and seems to be very common on the shores of the Adriatic near Trieste, since J. Müller speaks of finding the "molluskigerous sacs" in upwards of 70 individuals*. By the kindness of Dr. Hartmann of Berlin, we have received examples from the same locality. It was not found by Prof. Edward Forbes in the Ægean; the specimens distributed by him were taken by Mr. MacAndrew in Vigo Bay, on the north-east coast of Spain, in the year 1849. Last year (1857) we accompanied Mr. MacAndrew in a second dredging excursion to the same coast, and obtained numerous examples of the *Synapta* in 10-fathom water, a few miles below the town of Vigo; they had been previously found in shallow water, on the quarantine ground, about twelve miles higher up the bay. The specimens were small, none exceeding 6 inches in length and $\frac{1}{4}$ inch in diameter. In colour they were dull purplish red, slightly darker in front and on the back, and marked with five pale bands, indicating the longitudinal muscles which answer to the lines of suckers (or *ambulacra*) of the other *Echinodermata*. The skin was also mottled with minute red spots, produced by epidermal papillæ. We preserved every specimen we could find, hoping to detect the "molluskigerous sacs" in some new phase of their development; but in this we were entirely disappointed. The intestines of the creature were filled with inorganic mud, in which we detected an occasional Diatom or Rhizopod, but nothing more. When placed in basins of sea-water, they showed their tentacles freely, and most of them remained expanded when preserved in spirit. They were very sluggish, and did not evince much disposition to vomit their interiors or to break up into frag-

* U. S. DIGITATA und über die Erzeugung von Schnecken in Holothurien. Ito. Berlin, 1852.

ments. We readily detected them in the dredge, even when obscured with mud, by their clinging to the fingers, as described by Eschscholtz.

In some examples the *anchors* are very few, and ranged in a double line along the muscular bands. They vary from about twenty-five in the field of the inch object-glass to three times that number. Their length averages about the $\frac{1}{100}$ th of an inch. The anchor-flukes are sometimes plain, and sometimes barbed with three to five serrations (figs. 6-16). The *anchor-plates* are oval and leaf-shaped, having a process (or stalk) at the end to which the anchor is articulated; the disk is perforated by four large simple holes surrounded by an irregular series of smaller openings; the articular process has a slit like the eye of a needle (fig. 15). In the northern specimens these plates are rounded and rather "obcordate," but in those from the southern locality they are longer, less regular, and somewhat contracted in the middle; the perforations also are larger in proportion, and more angular.

Some specimens possess a few great anchors, four times as long as the rest, and with large flukes, lying with great regularity in the interspace of the muscular bands; their plates are correspondingly large, and irregular in outline (fig. 16).

All the anchors are fixed transversely to the *length* of the animal, some being turned one way and some the other.

Besides these, the skin contains innumerable smaller particles, or *miliary plates*, which are especially crowded over the muscular bands. They are oblong, or hour-glass shaped, and about $\frac{1}{4}$ th to $\frac{1}{2}$ th the length of the anchor-plates, or from $\frac{1}{1000}$ th to $\frac{1}{500}$ th of an inch long (fig. 17).

By far the greater number of the anchors are imbedded in the skin; only a few rise above the surface or swing freely on their pivots. They are developed beneath the epidermis, become liberated by the wearing of the surface, and are themselves broken by use and worn away and replaced by others. The anchors are developed before the anchor-plates. First, we find a simple, slender spiculum (fig. 1); then another (fig. 2), longer and expanded at one end; those only which have attained their full length begin to develop flukes (figs. 4, 5); and it is not until the anchors are completely grown that we detect any trace of the anchor-plate. This also makes its appearance as a straight needle lying beneath the middle of the shank; in the next stage it is forked at each end; these branches grow and divide again, until the plate is all sketched out, the margin being added last, and the whole becoming more solid (figs. 7-14). We have not met with any figure of the spicula of *S. digitata*, except the bad one given by Müller, whose work we have only been able to see in the Library of the Museum of Practical Geology.

2. SYNAPTA INHERENS (HOLOTHURIA), O. F. Müller. (Pl. XIV. figs. 18-22.)

The second European *Synapta* was discovered at Christiansand, on the coast of Norway, and figured and described in the 'Zoo-

logia Danica' (1781). The anchors and plates are also figured in the admirable Memoir of Duben and Koren*. The anatomy of this species is described at some length by M. Quatrefages†, who regarded it as a new species, and called it *S. Duvernoi*. These specimens were obtained on the coast of Britany, at the Isles Chaussey near St. Malo, where they were very abundant in the mud near low water, and attained a length of 10 to 18 inches, with a diameter of 5 to 12 lines.

The anchor-plates of this species (fig. 19) more nearly resemble those of the Red Sea *S. vittata* than the last. They are oval, with no arch or process at the articular end, and the disk is perforated by six oval cells surrounding a central opening each with a scalloped border, as in *S. vittata*.

The anchors have serrated flukes, the serrations varying from 3 to 7; and the anchors are sometimes shorter than the plates, sometimes considerably longer (figs. 18, 21).

The miliary granules are few, and confined to the muscular bands; they are only half as long as in *S. digitata*, and rudely crescent-shaped (fig. 20).

A specimen of this *Synapta* was obtained by Mr. Henslow at Aberystwith, and communicated in 1819 to Dr. Leach, who labelled it "*Jemania Henslowana*." It is a small individual with imperfectly developed spicula, but showing the characteristic pinnate tentacles.

In June 1856 Mr. J. W. Wilton, of Gloucester, found another example at Criccieth, on the same coast of Cardigan Bay. It was discovered under a stone, at low water, and presented the appearance of "a clear pinkish waving worm, about 3 inches long, with a number of little papillæ all over it, and five faint longitudinal bands from head to tail. It had twelve tentacles, with five digits on each side. It was perpetually waving and swelling in one part, contracting in another‡. It lived but a short time, and finally constricted itself and broke up into half a dozen fragments."

In February 1856 Mr. E. C. Buckland obtained a finer specimen under similar circumstances, in Lihou Bay, Guernsey. A microscopic preparation of the skin of this specimen shows 150 anchors in the field of the inch object-glass ($\frac{1}{4}$ inch diameter); and the anchors are more than half as long again as the plates§.

Mr. Cocks, who met with *Synapta inhærens* on the coast of Cornwall, regarded it as a variety of *S. digitata*. He describes it as having "13 digitated pinnæ on each tentaculum. Length of specimens procured from 1 to 2 $\frac{1}{2}$ inches by $\frac{1}{16}$ th to $\frac{1}{4}$ th of an inch. Found in hard and stony soil; Helford, scarce; Falmouth, very rare. I have kept them alive for months in sea-water procured from Helford

* Proceedings of the Royal Academy of Sciences, Stockholm, 1846.

† Annales des Sciences Nat. 2 sér. t. 17. Zool. p. 19.

‡ Forskål named one species *Synapta reciprocans*, on account of these remarkable muscular movements.

§ "Slides" of this specimen are in many cabinets, with a red label, but with no specific name or locality.

or Gwyllyn-vase, but they invariably broke into fragments as soon as water from Green Bank was thrown into the glass."

Lastly, two small specimens were dredged by Mr. MacAndrew in Bantry Bay, in August 1857.

SYNAPTA BIDENTATA, W. & B. (Pl. XIV. figs. 23-25.)

The new species which we have now to describe was presented to the Zoological Museum of the Cambridge University by the Rev. G. Vachell, who brought it from China. There is also a specimen in the British Museum presented by Mr. Reeve. In its contracted state it measures only 2 inches in length and 5 lines in diameter. The skin is unusually thick, much corrugated transversely, and thrown into five deep longitudinal folds. It is almost devoid of colour, but the ventral band may be distinguished by its breadth, the lateral being rather less wide, and the dorsal muscles narrower still. The twelve tentacles are each furnished with four lobed digits surrounded with a sheath.

The anchors are short and stout (rather shorter than those of *S. digitata*), with straight projecting "beams"; the flukes are smooth and bifid. From 50 to 70 occur within a radius of $\frac{1}{4}$ th of an inch (fig. 23).

The anchor-plates are obovate, truncated at the articular end, and pierced by very numerous circular holes, which diminish in size from the centre to the circumference. The margin is never completed (so far as we have seen), but the boundary of the external perforations is broken, like that of a wire-gauge (fig. 24).

The miliary granules are rather large, very numerous, and resemble cruciform fragments of the anchor-plates. Near the bases of the tentacles, they become still more numerous, larger, and more complicated (fig. 25).

Monstrosities.—As might be expected of minute organs indefinitely multiplied, monstrosities are not unfrequent. Mr. Hislop has a slide of *Synapta vittata* in which two of the anchors have double shanks, and we have seen *S. bidentata* with three flukes.

Genus CHIRIDOTA, Esch. Fig. 26.

This genus was proposed by Eschscholtz at the same time with *Synapta*. It was defined as having *digitate* tentacles, whilst *Synapta* had pinnate tentacles,—an unfortunate definition, as all the species figured in the 'Zool. Atlas' are represented with *pinnate* tentacles; and of the two other examples of *Chiridota* quoted, viz. *Holothuria inharens* and *H. lævis*, the first is a *Synapta* according to the author's own definition. It was on this account that Prof. Forbes referred our *digitate* species to *Chiridota*.

However, subsequent authors have agreed to apply the name *Synapta* to the species with anchors, which consequently adhere to the finger*; and to call those *Chiridota* which are ornamented with

* The name *Fistularia*, given by Forskal, has been abandoned, partly because the author included under it some true *Holothuria*, and chiefly because Lamarck employed it for these latter instead of the *Synapta*.

microscopic wheels. In *C. lævis* these wheels are very minute and clustered in little groups beneath the epidermis, and when the surface is raised with a needle point they are set free. In *Chiridota violacea*, figured by Müller in the Berlin Transactions, and again in Dr. Carpenter's 'Microscope,' the wheels are attached to a common connecting thread.

Prof. Steenstrup has formed a genus (or subgenus) for another Greenland species—*Myriotrochus Rinkii* (figs. 27–31), in which the wheels are larger and scattered over the skin, each having its own stalk. These wheels first appear as little stars, with rays or spokes of various number (18 to 25), which increase until they attain their normal length, and then expand at their ends until they join and form a rim (or *tire*) to the wheel. A ring of spines is afterwards formed on the thickened margin; the spines are pointed towards the centre of the wheel, and are as numerous as, or rather more numerous than, the spokes. As the wheels only occur on the three dorsal inter-muscular bands, they can scarcely assist in locomotion, and must be regarded as ornamental characteristics, such as nature loves to bestow for us to marvel at.

SYNAPTA, Eschscholtz, 1829.

1. *S. vittata* (*Fistularia*), Forskål, 1775. Suez, Red Sea.
2. *S. reciprocans*, Forsk. Suez, Red Sea.
3. *S. inhærens* (*Holothuria*), O. F. Müller, 1781 (= *Holothuria flava*, Rathke; *Jemania Henslowana*, Leach; *Synapta Duvernæa*, Quatr.). Christiansand og Kragerøe; Aberystwith and Criccieth, North Wales (*Henslow and Wilton*); Falmouth, Cornwall (*W. P. Cocks*); Bantry, W. Ireland (*MacAndrew and Barrett*); Guernsey (*E. C. Buckland*); Iles Chaussey, near St Malo (*Quatrefages*).
4. *S. digitata* (*Holothuria*), Montagu. Devonshire (*Mont., Cranch, Alder, Kingsley*); Falmouth (*Mr. Cocks*); W. Ireland (*Mr. Barlee*); Rothesay, Bute (*Mr. Alder*); Vigo Bay, N. Spain (*Mac Andrew*); Trieste (*Joh. Müller, Dr. Hartmann*).
5. *S. mamillosa*, Esch. Tahiti.
6. *S. maculata*, Chamisso & Eysenh., Act. Nat. Cur. x. p. 1. t. 25.
7. *S. ? verrucosa* (*Chiridota*), Esch. Sitcha, Russian America.
8. *S. Beselii*, Jäger, 1833. Celebes. Berlin Trans. t. 6. f. 15.
9. *S. radiosa*, Reynaud (teste Jäger). Comorandel.
10. *S. bidentata*, W. & B. 1858. China.
11. *S. lappu*, Müll. Berlin Trans. 1854, t. 6. f. 16. W. Indies.
12. *S. serpentina*, Müll. Id. f. 17. Celebes.

CHIRIDOTA, Esch.

1. *C. lævis* (*Holothuria*), O. Fabr. Greenland.
2. *C. violacea*, Peters. Mozambique.
3. *C. ? purpurea*, Less. Falkland Islands.
4. *C. lumbricus*, Esch. I. Radak, Coral Sea.
5. *C. discolor*, Esch. Sitcha, Russian America.

MYRIOTROCHUS, Steenstrup.

1. *M. Rinkii*, Stp. Greenland.

EXPLANATION OF PLATE XIV.

- Figs. 1-17. Spicula of *Synapta digitata*, Mont., magnified 125 diameters.
 Figs. 1-16. Anchors in various stages of growth.
 Figs. 7-14. Anchor-plates in various stages of growth.
 Fig. 15. Dwarf anchor and plate, close to fig. 16.
 Fig. 16. One of the larger anchors.
 Fig. 17. Miliary plates from one of the muscular bands.
- Figs. 18-22. Spicula of *Synapta inhaerens*, Müll., magnified 125 times.
 Fig. 18. Long anchor and plate, from the Guernsey specimen.
 Fig. 19. Anchor-plate more fully formed, from the Guernsey specimen.
 Fig. 20. Miliary plates, from Bantry specimen.
 Fig. 21. Anchor and unfinished plate, from Bantry specimen.
 Fig. 22. Anchor and plate in use, seen obliquely.
- Figs. 23-25. Spicula of *Synapta bidentata*, W. & B., magnified 125 times.
 Fig. 23. Anchor of Chinese *Synapta*.
 Fig. 24. Anchor-plate; the anchor thrown out of focus.
 Fig. 25. Miliary plates; the more complex from near the head.
- Fig. 26. One of the wheels of *Chiridota levis*, O. Fabr., Greenland, magnified 160 diameters.
- Figs. 27-31. Wheels of *Myriotrochus Rinkii*, Stp., Greenland, magnified 100 diameters.
 Figs. 27, 28. Young wheels, with unfinished spokes.
 Fig. 29. Wheel with the spokes full-grown and expanded at the ends.
 Fig. 30. Wheel with the spines beginning to appear on the tire.
 Fig. 31. Finished wheel of rather unusual size.

6. ON THE *VESPERTILIO SUILLUS* OF TEMMINCK, THE TYPE OF
 THE GENERA *MURINA* (GRAY), AND *OCYPETES* (LESSON).
 BY ROBERT F. TOMES.

Contemporaneously with the adoption of *Kerivoula* as a new genus, Dr. Gray gave the name of *Murina** to the species which Temminck had long before described under the name of *Vespertilio suillus*. During the same year, M. Lesson bestowed on it the generic appellation of *Ocypetes*†.

The departure in some of its external characters from the more ordinary species of *Vespertilio* was noticed by the original describer; but as his genus *Vespertilio* was a very comprehensive one, no generic separation was attempted. At a later date, but before the appearance of the names proposed by Dr. Gray and M. Lesson, Count Keyserling and Prof. Blazius, in the arrangement of the *Vespertilionidæ* appended to their paper on European Bats published in the fifth volume of Wiegmann's Archives, had placed this species by itself, immediately following their second group of the genus *Vespertilio*, as an aberrant form, but without any name.

* Ann. and Mag. Nat. Hist. vol. x. (1842), p. 258.

† Nouv. Tab. Règ. Anim. p. 30 (1842).

Dr. Gray and M. Lesson, as above noticed, have made it the type of a new genus, for which each has advanced a name; but the appearance of these names in one year, renders it difficult to ascertain which claims the priority—supposing that a name is required, which is by no means certain. As the name imposed by Dr. Gray has the advantage of that given by M. Lesson, in having an accompanying generic description, I should choose, if a name be required, to give it the preference, believing that the practice of making new genera by the mere alteration of a name, done in some instances in anticipation of the investigations of others, or on the mere chance of its turning out a genus, and without perhaps ever having seen the species, is a habit that cannot be too carefully avoided by the truth-seeking investigator.

At one time I was much disposed to adopt one of these names for the species under view; but a more intimate examination made me pause. I found that the external peculiarities on which the genus was founded were not supported by such characters in the cranium as I deemed essential to generic independence. But, at the same time, as I have been able to examine a limited number only of specimens, and all of them in the state of skin, I scarcely hold myself qualified to determine this point with certainty, and therefore shall content myself with giving what I believe will be found a more complete description than has yet appeared, and with pointing out some affinities with other species, which have been overlooked,—believing that this species, like many others, is one of those that are ever and anon appearing, to warn the scientific zoologist that while he constructs generic and other divisions, and expands or contracts them here or there, moulding them to what he thinks they should be, nature, working to her inscrutable ends, presents such an infinite variety of forms, as, in their numberless and complicated affinities, to baffle and perplex the most determined systematist.

In proceeding to give the characters of this species, I shall first give those which may be supposed to be of generic or subgeneric value, followed by a list of synonyms, and these again by the notice of such peculiarities, as appear purely specific. This paper will, by this arrangement, take the form of the other monographs which I have communicated to the Society.

The top of the head is but very little elevated above the facial line, just as in the group containing the *Vespertilio formosus*, *V. emarginatus*, *V. rufo-pictus*, and *V. Pearsonii*; and the muzzle is produced in about the same degree as in *V. formosus*. It has also about the same vertical thickness in relation to its breadth as in that species. The mouth and the end of the nose are also pretty much as in the examples of that group; but the nostrils have their margins so much produced as to have the appearance of two tubular excrescences, which, however, differ from the same parts in the Chinese examples of *V. formosus* (with which only I have compared it) in degree rather than in actual difference of form. The ears are rather large for the size of the animal, and are of a roundish oval form, with a

regular outline, and without trace of external basal lobe. In this respect they differ from those of the group above alluded to; but in the form of the tragus there is but a slight difference. It is straight, narrow, and pointed, but not so long; nor is the tip so acute.

The organs of flight are rather broad in relation to their length, and are furnished with a long and strong thumb having a very short basal phalange enclosed in a narrow piece of membrane extending from its joint along the upper surface of the index finger. Its second phalange is long, as in *V. formosus*, *V. emarginatus*, &c. The wing-membranes are said to extend the whole length of the foot, quite to the claws, which they certainly do in the specimen in the British Museum; but in a specimen in my own collection they do not reach to the claws; scarcely further than to the middle of the toes*. This I have been able to ascertain by softening the specimen; but one in spirit is required to determine this point with accuracy. The feet themselves are rather long, and have the toes of two-thirds their entire length.

The tail is a little longer in relation to the size of the animal than it is in the species of the group with which I have found it most nearly allied, i. e. the group containing the before-mentioned species, *V. formosus*, &c.

All the membranes are somewhat translucent; those of the wings are rather distinctly veined; and near to the sides of the body and legs they are marked with dotted lines, as is also conspicuously the case with the interfemoral membrane. The ears are faintly marked with small dots, but not nearly so much so as in *Kerivoula*.

The fur of the head extends uninterruptedly to near the end of the nose, in precisely the same manner as it does in *V. emarginatus*; and there is a similar naked space around the eye. All the upper surface of the interfemoral membrane is hairy, and the upper surface of the wing-membranes near to the body; but everywhere else the membranes are naked. On the back the fur is tricoloured; on the under parts it is bicoloured.

In general form the cranium very much resembles that of *V. emarginatus*; and in form and relative proportion the teeth are also similar, but differ in numbering one more premolar in the upper jaw, and one less in the lower. Their number may be thus stated:

$$\text{In. } \frac{2-2}{6}; \text{ Can. } \frac{1-1}{1-1}; \text{ Prem. } \frac{2-2}{2-2}; \text{ Mol. } \frac{3-3}{3-3} = \frac{16}{19}.$$

Those of the upper jaw are arranged in two straight lines, which are nearly parallel; and across the front opening of these the incisors are placed in pairs, of nearly uniform size, close together, with a very moderate interval on each side between them and the canines, and a moderate central opening. They are simple in form, with their cutting edges somewhat flattened. The canines are short and stout, somewhat

* This specimen is one I purchased with other Indian mammals, which formed part of the collection made by Capt. Boys.

conical, without accessory cusp or point, and with a feebly developed *cingulum* inside the tooth. Following these are two premolars, short and stout, and somewhat pyramidal in form, without internal lobe or projection. The following two molars are of the form so common in all the *Vespertilionidæ*; but they, like all the other teeth, have their cusps less acute than is usual, and the inner ones rather less extended towards the central part of the palate. The last molar is of small size, and transverse in form.

In the lower jaw the teeth are, as may be inferred from those in the upper, arranged in two straight lines, a little narrower in front than behind. The incisors are of the ordinary form, and trilobed; but the canines are very short and rather stout, and are furnished with an obtuse lobe on their inner surfaces sufficiently prominent to occupy a space equal in breadth to the two outer incisors on each side, behind and above which it may be seen when looking at the jaw in front. The same peculiarity occurs, but in a less degree, in the canines of the common *Noctule Bat*. The two next teeth are triangularly pyramidal in form, short and blunt, with faint indications of inner accessory cusps. Following these are the three true molars, requiring only to be noticed as having their cusps less acute than is usual.

VESPERTILIO SUILLUS, Temm.

V. suillus, Temm. Mon. ii. p. 224. pl. 56. f. 4, 5, 6, 1835-41; Wagn. Supp. Schreib. Säugth. i. p. 512, 1840; Keys. et Blas. Weigm. Archiv, vi. p. 2, 1840.

Murina suillus, Gray, Ann. & Mag. Nat. Hist. v. 10. no. 65. p. 258, 1842; Zool. Voy. Samar. no. 5. p. 9, 1849; Gervais, Voy. Castelnau, Mamm. p. 78, 1855; Horsf. Proc. Zool. Soc. pt. 24. p. 394, 1856.

Ocyptes suilla, Less. Nouv. Tab. Règne Anim. p. 30, 1842.

Noctulinia lasyura, Hodgs. Journ. A. S. Bengal, no. 182. p. 896, 1847.

On all the upper parts, with the exception of the interfemoral membrane, the fur is tricoloured, brown at the base, succeeded by pale rufous, and with the ends of the hairs of a brighter and deeper tint of the same colour; and in the specimen in the British Museum the extreme tips are a little paler, giving an indication of a fourth colour. The hair on the interfemoral membrane is of a uniform light brownish rufous colour. Beneath it is bicoloured, dark brown at the base, with its terminal third brownish cream-colour, but rufous on the humeral region. The specimen in the British Museum (included in Dr. Gray's Catalogue) has the fur much more distinctly marked with the different tints than the one in my own collection, in which they are very faint. The specimen in the Museum of the Hon. East India Company, collected by Mr. Hodgson in Nepal, and forwarded with the name of *Noctulinia lasyura* attached, has the colours well-marked. This, with the one in the National Collection, is decidedly smaller than the one in my own collection. M. Tem-

minck's specimen would seem to be smaller than either; but I cannot find any other disparity, excepting that of size, sufficiently marked to establish the existence of a second species. Probably the smaller island example, from which M. Temminck took his description, may hold the same relation to those from the continent of India, which the smaller specimen of *V. Pearsonii* from Amboyna does to those collected by Dr. Pearson at Darjeeling, of which I have spoken in a previous communication.

In the following Table the dimensions of column No. 1 are those of the specimen in the British Museum; those of No. 2 are from the one in my own collection (collected by Capt. Boys); No. 3 from M. Temminck's description, but reduced to English measure; and No. 4 from Mr. Hodgson's description of *Noctulinia lasyura*. A specimen bearing the latter name having been forwarded by that gentleman to Dr. Horsfield, has enabled me to identify it with the *V. snillus* of M. Temminck.

	1.		2.		3.		4.	
	in.	lin.	in.	lin.	in.	lin.	in.	lin.
Length of the head and body...	2	2	2	0	1	9	2	6
— of the tail	1	6	.....	.....	0	8½	1	9
— of the head	0	8	0	9	.....	.....	0	11½
— of the ears	0	4½	0	7	.....	.....	0	8½
Breadth of the ears .....	.....	.....	0	5½	.....	.....	.....	.....
Length of the tragus	0	3½	0	4	.....	.....	.....	.....
— of the fore-arm	1	2	1	5½	1	1	1	9
— of the arm .....	.....	.....	.....	.....	.....	.....	1	1½
— of the longest finger ...	2	4	2	9	.....	.....	3	3
— of the fourth finger ...	.....	.....	2	2	.....	.....	.....	.....
— of the thumb	0	5	0	5	.....	.....	.....	.....
— of the tibia	0	7	0	8	.....	.....	.....	.....
— of the foot and claws...	0	3½	0	4½	.....	.....	.....	.....
Expanse of wings.....	9	2	10	9	7	9	13	0

Hab. Java, Sumatra, and the continent of India.

Although Mr. Hodgson has forwarded an unquestionable example of this species under the name of *Noctulinia lasyura*, yet the dimensions which are appended to his description are more nearly those of *V. Pearsonii*. It is quite possible that the two may have been confounded.

During the examination of this singular species, its affinities with the group consisting of *V. formosus*, *V. emarginatus*, *V. rufo-pictus*, and *V. Pearsonii* become sufficiently manifest. The general form of the head and face, of the tragus, of the organs of flight and the members of support, the quality and distribution of the fur, but, more than all, the general conformation of the cranium and the shortness of the teeth, are points of essential resemblance,—whilst the differences are, with the exception of that in the number of the pre-molars, purely external. So external are they, that a neat hand, with the assistance of a pair of scissors and a sharp knife, might speedily, with very slight alteration, remove all the external peculiarities of *Murina*. If a very small piece were scooped out of the outer margin of the ear, it would resemble that of *V. Pearsonii*; if the

prominent rim of the nostril were reduced a little, the nose and face would precisely resemble the same parts in *V. formosus*; and if a mere scrap of membrane were taken from the margin of the wing near to the toes, reducing it to the base of the latter, the change would be complete.

The more important difference therefore consists in the presence of an additional premolar in the lower jaw, and the absence of one in the upper jaw.

Mr. W. H. Flower exhibited a flying fish (*Exocetus volitans*), to which was attached a specimen of *Penellus Blainvillii* (Milne-Edwards, Nat. Hist. des Crustacés)—*Leoneopenna Blainvillii* of Lesueur. The latter was $2\frac{1}{2}$ inches long; the head and three horn-like processes were buried in the muscular mass on the right side of the spinal column of the fish, and the whole of the exposed part gave lodgment to a colony of little Cirripeds—*Conchoderma virgata*, Spengler, sp. (Darwin's Monograph of Cirripedia); these were of various sizes, the largest measuring 9 lines in length.

When first caught they were all living, and being placed in a basin of sea-water, exhibited beautifully the characteristic motions of the Cirri; while a circulation was also observed in the Lernæad.

The specimen was taken in the Atlantic Ocean, about $5^{\circ} 17'$ south latitude, and brought home by Mr. Walter Crisp, Surgeon to the 'Monarch,' East Indiaman.

July 27, 1858.

Dr. Gray, F.R.S., V.P., in the Chair.

Mr. Gould exhibited a drawing of a very remarkable Bat which had lately been transmitted to him from Melbourne, Victoria, by Dr. Ludwig Becker, under the impression that it was a new and undescribed species, but which proved to be identical with the *Molossus australis* of Dr. Gray, characterized more than twenty years ago from the unique example contained in the Museum of the United Service Institution. Mr. Gould remarked that the receipt of this drawing was of especial interest, inasmuch as it proved that the animal is a native of Australia, a fact which, from the circumstance of no other example than the one referred to having been hitherto found in that country, had been disputed; the form being Brazilian.

The following papers were read :—

I. ON THE GEOGRAPHICAL DISTRIBUTION OF REPTILES.
By DR. ALBERT GÜNTHER.

It was with great pleasure I read Mr. Slater's paper 'On the Geographical Distribution of the Members of the Class Aves,' published in the 'Proceedings of the Linnæan Society,' February 1858. And again, in personal interviews with my friend on similar subjects I had often the satisfaction to agree with him in results he had gained from another part of the animal kingdom. But such gratifying results as we find in the aforesaid paper can only be obtained, not merely by an extended knowledge of the whole animal kingdom, but by a complete knowledge of the details of a separated portion of it ; and the reason why all the attempts at a general account of the geographical distribution of animals are not satisfactory enough for the naturalist, is to be found in the circumstance, that the authors were not acquainted in the same degree with every part of the subject treated, as also in our limited knowledge of zoology. Thus I may follow the example of Mr. Slater and give for the present only an account of the geographical distribution of those animals, to the knowledge of which especially I have latterly devoted myself ; and often referring to that paper, I shall show how far I can agree with the general views contained therein, and whether these parts of the natural kingdom give us a division of the earth's surface into the same natural provinces.

PART I.

ON THE GEOGRAPHICAL DISTRIBUTION OF THE SNAKES.

Schlegel, as he first founded philosophical views in the knowledge of Snakes, first gave an essay on their geographical distribution, showing the then most possibly exact locality of the species. He however only pointed out the geographical areas over which the species extends,—certainly the first basis upon which a knowledge of the geographical distribution of the families and genera can be founded. But at that time the much more limited knowledge of specific forms obliged him to establish genera of too great extent ; and in consequence he could not bring ; in a more or less accordant correspondence with a certain province of the earth's surface, those genera which are really peculiar to such a separated district. And although that sketch, by which the first volume of Schlegel's 'Essai' is concluded, deserves the more admiration, as this part of the science, not previously cultivated, was raised by him at once to a degree of philosophical view adequate to his system : it must share the destiny of every such attempt, when our knowledge of the fauna as well as of the geography is more advanced : many stated truths will hold good—a part or all the principles applied before will form the basis of the next attempt ; but many other points will appear to be modified or wrong, and will be placed with other results. For a better

understanding, one may compare my view of the geographical distribution of Reptiles in Africa with that of Schlegel. In this attempt I have maintained his idea of *species*, but I think I have gained more general and more true results by more limited genera (far different from those "subgenera," which are in fact species) and by a modified view of the geographical regions. But we now also want far more correct information concerning the genera and families, before we arrive at very satisfactory conclusions.

There is, in the first place, a much greater disproportion in the distribution of Reptiles over the different regions, with respect to the number of genera and species, as well as to individuals. Amphibian life is entirely different from that of the higher animals, being exposed to the slightest modifications of external physical influences; and there are again great differences among the Reptiles themselves. Let us compare some of our Snakes with Batrachians, in a few instances only. Frogs and Toads are found on the Shetlands, whilst *Vipera berus*, the most northern Snake, is already scarce in the north of Scotland. *Rana temporaria* is met with in the Alps round lakes, near the region of eternal snow, which are nine months covered with ice; whilst *Vipera berus* reaches only to the height of 5000 feet in the Alps, and of 7000 in the Pyrenees. A Triton or a Frog being frozen in water will awake to its former life, if the water is gradually thawed; I found myself that even the eggs of *Rana temporaria*, frozen in ice during seven hours, suffered no harm by it, and afterwards were developed. A Snake can only endure a much less degree of cold: even in the cold nights of summer it falls into the state of lethargy; it awakes late in the spring, when some Frogs and Tritons have already finished their propagation; it retires early into its recess in harvest while still the evenings resound with the vigorous croaking of the Tree-frogs and the bell-like clamour of *Alytes obstetricans*. Our European Snakes die generally, in captivity, during the winter, partly from want of food, partly by the cold nights. The eggs of our oviparous species are deposited during the hottest part of the year, requiring a high temperature for development. Further, though some accounts of Batrachians enclosed in cavities of the earth or trees may be exaggerated, the fact is stated by men whose knowledge and truth are beyond all doubt, that such animals live many years apparently without the supply of food necessary for preserving the energies of the vital functions*. Dr. A. Smith himself was an eye-witness how several specimens of *Brachymerus fasciatus* were found in a lethargic state in a hole of a tree, completely closed, conspicuously open before and grown together afterwards. Such a tenacity of life is never to be observed in a Snake: the higher the temperature the greater is the need of food; and a Snake having endured fasting during six or nine months always dies. Moreover, the tenacity of life in the Batrachians is proved by their power of reproduction, which never has

* Cf. "Observations on the Common Toad, and on its long abstinence from food," by John Brown, Esq. (Ann. & Mag. Nat. Hist. 1842, vol. x. p. 180).

been observed in a Snake. If we add the fact that Snakes do not produce many eggs or young ones, that they are able to propagate only when several years old, that they incur continual dangers by their numerous enemies, and that they are deprived of the means of performing distant journeys, we must consider it as the natural consequence, that no species will spread so far as Batrachians. These are enabled to endure temporary physical disadvantages, to traverse localities without the regular supply for their life, and to make up yearly for the lost number by a numerous offspring. More or less confined to a fluid element, they are favoured by another agency for an easier spreading. But these facts are really applicable to a comparatively small number of species only; and the question why we do not find all these peculiarities equally exhibited in all the Batrachians or in a great part of them, is as difficult to be answered as why one species is richer of individuals than the other: but it is remarkable that just those species which are spread over the widest range are also those distinguished by an intensity of individuals.

On the other hand, we find Snakes almost entirely limited to the original locality of the individual: but if the individuals are restricted to the soil which gave them birth, the whole group, formed by such individuals, is likewise stationary; and if there be different creations, corresponding to the different natural divisions of the earth's surface, such a group as the Snakes must be best adapted for proving it, because here the agencies are wanting by which a species or a genus is spread over a larger part of the globe in the course of time, thus becoming mixed with foreign forms.

After these preliminary remarks, I proceed to the special objects of our inquiry; and we shall then see what conclusions can be formed in comparison with those of the ornithologist*. According to the above-stated peculiarities of the life of Snakes, there is *no cosmopolitan species*, and we can find only a few examples where one and the same species extends over the borders of the neighbouring region (cf. p. 378, *Naja haje*, *Echis carinata*, *Zamenis ventrimaculatus*, and p. 385–386, some species ranging from the Nearctic region into the Neotropical, and *vice versa*). Among the genera we do not find one true *cosmopolitan genus*. *Tropidonotus* is one of those which have the widest range, a genus containing about thirty well-known species, each of which bears natural characters so conspicuous, that its position in the system is not to be mistaken: they are not to be found in the Ethiopian region only; they are truly called freshwater Snakes, following the course of the rivers and the borders of lakes. Some of the species (*T. natrix*, *hydrus*, *quincunciatus*, *ordinatus*, *fasciatus*) have a very wide range within the borders of its peculiar region. A few of the Asiatic species exhibit slight modifications of the general appearance of the genus (*T. cerasogaster* and *vibakari*).

* As for the systematical denominations adopted, I refer to the 'Catalogue of Snakes' (*Crotalidæ*, *Viperidæ*, *Hydridæ*, *Boidæ*) by J. E. Gray, London, 1849, and to my Catalogue of Colubrine Snakes in the Collection of the British Museum, London, 1858.

The second genus, which may be almost called a cosmopolitan, is *Coronella*, being spread over the whole globe except the Indian region, where it is replaced by such modifications of the characters as to justify the separation of them into new genera—*Simotes* and *Ablabes*, sp. The latter, closely allied to *Coronella*, accompanies this genus, extending over all the regions, except over the Australian one. Thus, if I speak hereafter of cosmopolitan genera of Snakes, they are to be understood with the restrictions mentioned. The *families* of Snakes in the different systems are at present founded upon such general characters, that in most of them genera of some or of all the geographical regions are comprised; perhaps at some later period they will be limited to more contracted boundaries of less general characters, thus approaching more to the borders of the geographical regions. But for the present we cannot derive from them our deductions as to the primary creation of the natural regions of the earth's surface, as the ornithologist does; and we are obliged to confine our views to the genera: we have not even such families of Snakes as are peculiar to one of the two great geographical divisions, either to the old world or to the new, except those in which the characters of the family are identical with those of the single genus. This discrepancy between Ornithology and Herpetology may be caused by a different systematic treatment of the characters, and may be more reconciled together by time; but there will always remain forms common to the new and old world. Therefore it is not possible to give a list of *Familie Neogeanæ* and *Familie Palæogeaneæ* (cf. Sclater, l. c. p. 133).

But I may here give an account of such genera as, I think, will still long remain examples of forms common to the new and old world (cosmopolitan genera excepted): they are *Rhabdosoma*, *Coluber*, *Spilotes*, *Coryphodon*, *Cyclophis*, *Philodryas*, *Dipsas*. I could add as many other genera; but I think such genera as *Rhinostoma*, *Dryophis*, &c. will be subdivided hereafter into two. Further, with regard to the aforesaid genera, the same observation as in Ornithology cannot be made, viz. that these are invariably genera belonging to temperate regions, disappearing entirely before we reach Tropical and Southern America. A part of the members of these genera are peculiar to Neotropical (Tropical America) Ophidio-fauna; a part reaches the Tropics in the old world, and a third part belongs to the temperate portions of both hemispheres.

Taking the amount of similarity or dissimilarity of ornithic life as a guide, Mr. Sclater states the following primary divisions of the earth's surface:—

I. *Palæarctic Region* (Regio Palæarctica).

Extent.—Africa, north of the Atlas; Europe; Asia Minor; Persia and Asia generally, north of the Himalaya Range, upper part of the Himalaya Range (?); Northern China, Japan, and the Aleutian Islands. Approximate area of 14,000,000 square miles.

II. *Æthiopian or Western Palæotropical Region* (Regio *Æthiopica*).

Extent.—Africa, south of the Atlas Range; Madagascar; Bourbon; Mauritius; Socotra, and probably Arabia up to the Persian Gulf, south of 30° N. lat. Approximate area of 12,000,000 square miles.

III. *Indian or Middle Palæotropical Region* (Regio *Indica*).

Extent.—India and Asia generally, south of the Himalayas; Ceylon; Burmah, Malacca, and Southern China; Philippines; Borneo; Java; Sumatra, and adjacent islands. An area of perhaps 4,000,000 square miles.

IV. *Australian or Eastern Palæotropical Region* (Regio *Australiana*).

Extent.—Papua and adjacent islands; Australia; Tasmania and Pacific Islands. An area of perhaps 3,000,000 square miles.

V. *Nearctic or North American Region* (Regio *Nearctica*).

Extent.—Greenland and North America, down to centre of Mexico. Area of perhaps 6,500,000 square miles.

VI. *Neotropical or South American Region* (Regio *Neotropica*).

Extent.—West India Islands; Southern Mexico; Central America, and whole of South America; Galapagos Islands; Falkland Islands. Estimated area of about 5,500,000 square miles.

The notices devoted to each region will show how great the conformity is, which this most natural division and the definition of the limits of the regions find in Herpetology.

I. *Palæarctic Region* (Regio *Palæarctica*).

Characteristic forms.—(*Calamaria*?) *coronella*, (*Tachymenis*?) *vivax*, (*Simotes*?) *diadema*, *Rhinechis*, *Zamenis*, *Chorisodon*, *Cælopettis*, *Eryx*, *Pelias*, *Vipera*, *Echis*, *Cerastes*.

Form common with India.—*Trionocephalus*.

This region is at once distinguished by the small number of generic forms and of species; great variety of amphibian life is produced only by the sun of the Tropics, and dependent upon a similar variety of the vegetative world. Where the soil is covered with social plants, either trees or grasses, there we find an equal uniformity in the life of Reptiles, which uniformity is still more manifest in temperate zones.

North of the 62° N. L. no Snake has hitherto been found; and thus the forty species which live within the boundaries of this region are very unequally distributed over an area of 14,000,000 square miles. We have on the average a single species to each 350,000 square miles. All species are of a small size, dusky colour, and of a timid disposition; far the greatest part belongs to the *Colubrina*;

their ratio to the *Boina* being that of 20 : 1, and to the *Viperina* of 4 : 1.

The identity of the creation in the different provinces of this region may be represented by the following examples, which will forcibly show the reason why I unite the Æthiopian shores of the Mediterranean especially with this region, instead of considering Spain and Portugal as a part approximate more to Africa than to Europe, as Schlegel did. *Eryx jaculus* may be traced from the eastern half of the shores of the Mediterranean, through the temperate part of Asia, into the south of Siberia; *Tachymenis vivax* from Egypt northwards to Hungary. Further, the genus *Zamenis* is one of the most characteristic types of this region,—*Z. atrovirens* being spread along the northern shores of the Mediterranean, *Z. Cliffordii* along the southern ones, *Z. hippocrepis* and *dahlui* going entirely round this inland sea, *Z. ventrimaculatus* reaching from Egypt through Kurdistan to the south of the Himalaya, and, finally, *Z. caudolineatus* being a native of Kurdistan. *Coronella austriaca*, more common in the parts north of the Alps, is replaced in the south by *C. girundica*, in the north of Africa by *C. cucullata*. *Tropidonotus natrix*, reaching into the heart of northern Asia, is represented in North Africa by *Trop. viperinus*. *Trop. hydrus* appears to range still further towards the west of Asia. *Coluber quadrilineatus*, common on the northern shores of the Mediterranean and on its eastern islands, is again found in the north of China. *Cælopetis*, a true native of northern Africa, is found in the Pyrenean peninsula. *Pelias berus* inhabits Ireland, Scotland, England, Norway, Sweden, and all the central parts of Europe, and is again found on the shores of the Lake of Baikal.

The viperine snakes of this region exhibit generic differences on the north and south of the Mediterranean,—on the former being found *Pelias* and *Vipera*, on the latter *Echis* and *Cerastes*. But the above-stated facts sufficiently show that the lower part of Egypt is to be united with this region as well as Algiers; and I wonder that Mr. Selater leaves it uncertain whether he includes that part of Egypt or not. A few true African forms intrude themselves into the African parts of the region; *Echidna atricauda* and *mauritanica* are found in Algiers, and *Noja haje*, following in many varieties the course of the African rivers, comes down with the Nile and reaches the Delta. That *Echis carinata*, more frequently met with in the East Indian continent, is also found in Egypt, is a curious fact stated by Duméril and Bibron (vii. p. 1448); and as Schlegel mentions it as being found also in the deserts south of the Caspian Sea, it quite corresponds to the aforesaid range of *Zamenis ventrimaculatus*.

The genus *Trigonocephalus*, which has its focus in the Indian region, is curiously enough represented by a single species (*T. halya*) in the southern parts of Siberia, reaching into the north of the Caspian sea. Thus of all the genera peculiar to the Indian region, *Trigonocephalus* advances furthest northward, emitting moreover another species (*T. Blomhoffii*) to Japan.

Japan, that outpost of the palæarctic region, is not in the same way peopled with palæarctic snakes as we find it with palæarctic

forms of other parts of the animal kingdom. As for the Herpetology in general, it is truly a debateable ground between Palæotropical and Indian Amphibio-fauna: but as for the *Ophidii*, it belongs entirely to the Indian region; for the present, at least, we do not know one Japanese snake found also in the Palæarctic region, or even only belonging to one of its peculiar generic forms.

II. *Æthiopian or Western Palæotropical Region.*

Characteristic forms.—*Hortulia*, *Sanzinia*, *Pelophilus*, *Casarea*, *Calabaria*, *Homalosoma*, *Psammophylax*, *Heteronotus*, *Prosymna*, *Meizodon*, *Psammophis*, *Dasypeltis*, *Bucephalus*, *Hapsidophrys*, *Langaha*, *Sinocephalus*, *Lamprophis*, *Alopecion*, *Lycophidion*, *Metoporphina*, *Boodon*, *Holuropholis*, *Naja haje*, *Cyrtophis*, *Elaps?* *hygiae*, *Dendraspis*, *Causus*, *Sepedon*, *Atractaspis*, *Clotho*.

Forms common with other regions.—*Philodryas*, *Chrysopelea*, *Ahatulla*, *Dryophis*, *Leptodeira*, *Dipsas*, *Dipsadoboa*.

We now enter a tropical region, and immediately find forms of gigantic magnitude, variety, and vivacity of coloration, and a great multiplication of the number of generic forms and of species, although only the southern part of this truly continental region has been examined in a satisfactory manner; it is not many years since the borders of Western and of part of Eastern Africa were searched through; and the great enrichment of zoological knowledge, produced by this first progress, promises the most extensive results to those daring attempts to cross a continent which, instead of being a continuous burning desert, contains a new world of vegetable and animal life. An enumeration of the reptiles of Western Africa, by Dr. Gray (see *ante*, page 155 *et seq.*), shows how greatly our knowledge of the Herpetology of that country has been enlarged in the lapse of a few years. Thus I hope that the ratio here given of the geographical area and distribution of the *Ophidians* will only be a proof of the distance between our present knowledge and that of the coming decennium. Taking the area of this region at 12,000,000 square miles, and the number of species of Snakes contained therein at 80, we have on the average a single species to each 150,000 square miles, or $2\frac{1}{2}$ species to the same area for which we found only one in the palæarctic region.

The number of *Colubrina* is again predominant, but is to that of the *Boina* only as 8 : 1, and to that of the *Viperina* as 11 : 1; the proportional number of the *Boina* therefore is enlarged, that of the *Viperina* diminished. We must observe, first, as a peculiarity of this region, that at present there is not one species known of the genus *Tropidonotus*. Schlegel believed he found its representative in *Dasypeltis scaber*; but a snake living on trees, devouring eggs of birds, the shells of which it breaks by gular teeth, with irregular arrangement of the lateral scales, is a form quite peculiar in itself, and quite peculiar to this region. Highly interesting is the fact, that more than one-third of the genera live on trees; which ratio is never met with in any of the other regions: there we find a member

of the family of *Lycodontidæ*, a family which contains either Ground-snakes, or forms only slightly approaching to that structure which indicates the capability of climbing trees, entirely transformed into a very Tree-snake (*Simocephalus*). There we find Tree-snakes with perforated fangs in front (*Dendraspis*). The African species of *Naja* (*N. haje*), so closely allied to the Indian *Cobra de Capello*, is to be considered as a Tree-snake as well as Ground-snake, whilst *N. tripudians* never appears to climb trees. But the Indian and the African species offer a similar series of varieties, and it would be, in many cases, very difficult to assign one of those varieties, if of unknown origin, to the right species, without the single character of the sixth upper labial shield. The question whether those varieties really are species is not yet decided. Every large collection should gather of both forms as many specimens as possible, with the most accurate accounts of their localities. There are about 70 specimens in the collection of the British Museum; but even by this number I was not enabled to distinguish separate species within accurately limited boundaries.

Another peculiarity of this region is the abundance of Snakes provided with longer front teeth, or *Lycodontidæ*; and it agrees also in this respect with India: in fact, the western and middle palæotropical regions equally partake of this family, each region producing a form with entire subcaudal plates. *Venomous Colubrina* occupy here a great part among the *Ophidia*, a greater one than the true *Viperina*; and they also exhibit quite a peculiar group, namely such *Colubrina* as are provided with permanently erect and perforated fangs (*Dendraspis*, *Atractaspis*). As our knowledge of the whole region is very limited, so also is the case with the large island connected with it, Madagascar. The following Snakes are known belonging to its fauna:—

Sanzinia. Pelophilus.

Heterurus gaimardii and *artifasciatus*.

Psammophis sibilans, var.

(*Herpetodryas bernierii*. Isle de France).

Herpetodryas quadrilineatus.

Enicognathus rhodogaster.

Philodryas miniatus and *goudotii*.

Ahetulla lateralis. Langaha.

None of these Snakes, except *Psam. sibilans*, have been found on the continent of this region, or in any other part of the globe; and it may be a question, as already suggested by Schlegel, whether such a separate and peculiar fauna as that of Madagascar might not form ground for establishing a separate region, small for the geographical area, rich for its animal and vegetative life, if the still hidden parts should prove to be as peculiar as that which we know. *Sanzinia*, *Pelophilus*, *Langaha* form genera not represented by other species in other provinces.—If we look at the forms common with other regions, we find them all to be Tree-snakes, having the allied species spread over the tropical regions in the west or east.

III. Indian or Middle Palæotropical Region (Regio Indica).

Characteristic forms.—*Chersydrus*, *Acrochordus*, *Xenodermus*, *Python*, *Cliftia*, *Cusoria*, *Gongylophis*, *Clothonia*, *Cylindrophis*, *Calamaria*, *Rhabdion*, *Brachyorrhos*, *Aspidura*, *Haplocercus*, *Elapoidis*, *Trachischium*, *Oligodon*, *Simotes*, *Ferania*, *Homalopsis*, *Phytolopsis*, *Tropidophis*, *Hypsirhina*, *Fordonia*, *Racilitia*, *Miralia*, *Xenodon* (with keeled scales), *Gonyosoma*, *Euophrys*, *Psammodynastes*, *Passerita*, *Leptognathus*? *indicus*, *Amblycephalus*, *Pareas*, *Hologerrhum*, *Lycodon*, *Tetragonosoma*, *Leptorhyton*, *Ophites*, *Cercaspis*, *Cyclocorus*, *Hamadryas*, *Bungarus*, *Naja tripudians*, *Elaps* (with thirteen rows of scales). HYDRIDÆ, *Trimesurus*, *Parias*, *Megæra*, *Atropos*, *Trigonocephalus*, *Daboia* (except *D. xanthina*, Gray).

Forms common with other regions.—*Rhabdosoma*, *Cerberus*, *Coluber*, *Elaphis*, *Spilotes*, *Coryphodon*, *Chrysopelea*, *Dendrophis*, *Dryophis*, *Eudipsas*, *Dipsas*, *Dipsadomorphus*, *Echis*.

Whether the Indian region really is richer in peculiar generic and specific forms than the African one, or whether this difference is caused only by our more extended knowledge of the former, the future will show; for the present it is not even rivalled by the South American region: for taking the area of the Indian region at 4,000,000 square miles and the number of species of Snakes at 240, we have on the average a single species to each 17,000 square miles, or 21 species to the same area for which we found only one species in the palæarctic region, and 9 for the same area in the Æthiopian. The ratio between the different sections of the Snakes, shows that, in comparison with Africa, the relative number of *Boina* is diminished, their ratio to the *Colubrina* being = 1 : 12, but that of the Viperine Snakes has as much enlarged as the absolute one: each seventh species belongs to this truly venomous section (1 : 6). Quite a new form of snakes enters into this fauna—the *Hydridæ*: organized for living in the sea, they are seldom found on the coasts, and we do not yet know whether they approach the beach occasionally, or when obliged by certain physiological functions. But being constant inhabitants of the sea, they are endowed with active as well as with passive locomotion, to enable them to traverse greater distances than the snakes living on dry ground; and therefore it is not to be wondered at that we find not only the section in general, but the single species spread far beyond its actual native ground—namely the sea between the southern coast of China and the northern one of New Holland—and extending to the south of the Australian region, and far between the tropical islands of the Pacific. A certain proximity to land appears to be necessary for their life, as they are never found in those wide marine spaces which are void of islands, not being able by traversing them to spread into the Neotropical or Æthiopian regions*; and thus they

* During the printing of this paper, I first heard of Sea-snakes seen near the western shores of America. They were observed in considerable numbers by M. Sallé and Mr. Salvin, at different times, from steamers crossing the Bay of

may be brought as properly as marine birds into the statement of the ratio between the number of species and the area of dry land. A second form, quite peculiar to this region, are Snakes covered with granular tubercles, *Chersydrus*, *Acrochordus*, *Xenodermus*; without being venomous, they approach to the *Hydridæ* by the genus *Chersydrus*, an inhabitant of rivers and their mouths, and with an organization like that of true Sea-snakes. As the family of the *Lycodontidæ* is to be assigned to the Indian and African region, each exhibiting different genera, so that of the *Calamaridæ* is divided in the same way between the neotropical and this region; whereas *Homalosoma* and two species of *Rhinostoma* perhaps afterwards may be separated from this family. The above-mentioned genera of *Calamaridæ* are very characteristic, and the very aberrant forms which abound in India are here represented by a genus of this family having no palatine teeth. Those intermediate forms between the well-proportioned structure of the family of *Colubridæ* and the excessively slender one of the true Tree-snakes, which I unite in one family of *Dryadidæ*, and which are so common in the Neotropical region, are scarcely represented by some species of *Cyclophis* and *Gonyosoma*. The genus *Ahetulla* is here represented by *Dendrophis*—in one species (*D. picta*) extending to New Guinea, in another (*D. punctulata*) to Australia. *Dryophis* is found in the Neotropical region as well as in the Indian one, but the species of both regions differ in dentition; the African species (*D. Kirtlandii*) agrees with the South American ones; finally, *Passerita* is only limited between the boundaries of the East Indies. If we exclude the *Hydridæ*, the number of venomous *Colubrinae* is far surpassed by that of the *Viperina*, and all the latter exhibit the peculiarity of having a pit on the side of the face, which is also found in the representatives of the New World, not in those of Africa. Ceylon offers a remarkable exception, producing a form without such a pit.

Among those large islands which are connected with the Middle Palæotropical region, none offer forms so different from those of the continent and the other islands as Ceylon: it might be considered the Madagascar of the Indian region. We not only find there peculiar genera and species, not again to be recognized in other parts, but even many of the common species exhibit such remarkable varieties, as to afford ample means for creating new nominal species.

1. *Calamaria* and *Elaps* are not represented in this island.
2. The following species are common to Ceylon and the other parts of the region, the Ceylonese specimens exhibiting no remarkable variation:—*Simotes russellii*, *Coryphod. blumenbachii*, *Ablabes collaris*, *Chrysopelea ornata*, *Dendrophis picta*, *Tropidonot. stolatus*, *Lycodon aulicus*, *Naja tripudians*.
3. Ceylonese specimens of the following species always exhibit one and the same variation:—*Simotes purpurascens*, *Tropidonotus*

Panama, and were about the size of an eel. I have not the slightest reason to doubt the credibility of the observers; but as long as we have not obtained them, it will always be a question whether the animals seen are Snakes or not.

quincunciatus (two Ceylonese varieties), *Tropidonotus chrysargos*, *Passerita mycterizans*, *Bungarus fasciatus*.

4. The following species are peculiar to Ceylon, but representatives of the genera are found in other parts of this region :—*Cylindrophis maculata*, *Oligodon sublineatus*, *Cynophis helena* (appears to be the representative of *Elaphis subradiatus*), *Cyclophis calamaria*, *Dipsadomorphus ceylonensis* (is the representative of *D. trigonatus*), *Trimerurus ceylonensis* and *nigro-marginatus*, *Megæra trigonocephala*, *Trigonocephalus hypnalis*, *Daboia elegans*.

5. Finally, the following genera, exhibiting entire subcaudal plates, are peculiar to Ceylon :—*Aspidura*, *Haplocercus*, *Cercaspis*.

If we look at the forms of this region, common with other ones, we see that most of them belong to the two genera of Schlegel's *Coluber* and *Dipsas*. The separation of the former into smaller natural genera has not yet been effected in such a way as to satisfy the systematist ; and therefore it is the less fit for a consideration of its geographical distribution (genus *Zamenis* excepted). Nearly the same is the case with the genus *Dipsas* ; and even if we separate single forms more aberrant from the general type, there remain a great many species which, comprised in one genus, do not give us the idea of a cosmopolitan genus, but of a "tropicopolitan." Species of *Rhabdosoma* are found in the Neotropical, a single species of *Cerberus* and *Dendrophis* in the eastern Palæotropical region ; the geographical distribution of *Dryophis* and *Echis* has been stated above.

I may add a few words to prove what I have before mentioned, viz. that the Snakes of Japan belong to the fauna of the Indian region. The following species are known from these islands * :—

1. *Tropidonotus tigrinus*, and

2. *T. Vibakari* belong to a cosmopolitan genus ; but the former, being also found near Ningpo in China, belongs to a group of this genus, which is formed solely by natives of India ; and the second species is the single type of another peculiar group (see Catal. of Colubr. p. 60).

3. *Coluber conspicillatus*,

4. *Elaphis quadrivirgatus*, and

5. *Elaphis virgatus*, exhibit not only a remarkable similarity in general habits, and in the system of coloration, with other true East Indian Snakes (*Elaphis subradiatus*, &c.), but the two latter are also found on the Indian continent, in China, south of the Yellow River.

6. *Trigonocephalus Blomhoffii* belongs to a genus with four species in the East Indies and one in the northern parts of Asia.

How greatly different the view gained by a consideration of the geographical distribution of the Batrachians is, we shall see in the Second Part of this paper. Our knowledge of the Herpetology of Celebes is yet too limited to allow a satisfactory attempt to compare its fauna with that of other parts.

* Cf. Schlegel, 'Fauna Japonica'—"Reptiles."

IV. Australian or Eastern Palæotropical Region (Regio Australiana.)

Characteristic forms.—*Morelia*, *Liasis*, *Nardoa*, *Enygrus*, *Bolyeria*, *Myron*, *Glyphodon*, *Diemansia*, *Hoplocephalus*, *Pseudechis*, *Pseudonaja*, *Brachysoma*, *Vermicella*, *Acanthophis*.

Forms common with other regions.—*Cerberus*, *Dendrophis*, *Dipsas*, *Hydridæ*.

What I have said in the beginning of my notices on the Æthiopian region I can as justly repeat respecting this part of the globe, the borders only of which are known to us; so that the proportionate numbers here given will be far from truth, and can be only considered to be proportionate to our present knowledge. If we allow 50 species as peculiar to this region, and take the area of dry land at 3,000,000 square miles, we have on the average a single species to each 60,000 square miles, or $2\frac{1}{2}$ species for the same area in the Æthiopian; but the Indian region is richer, giving $3\frac{1}{2}$ species for the same area, in which we have only one in the Australian.

We find a peculiar character of this region in the ratio between the numbers of species in the different sections of the Snakes. Two-thirds are venomous snakes—a disproportion not again to be found in any of the other regions, where the number of innocuous snakes always far predominates; secondly, two-thirds of the non-venomous snakes are *Boidæ*; thirdly, there is only one genus (*Acanthophis antarctica*) belonging to the tribe of *Viperina*, the whole number of the other venomous snakes being constituted by *Colembria* with grooved fangs. We know only six non-venomous *Colembria* from New Holland, two of which (*Coronella australis* and *Tropidonotus picturatus*) belong to cosmopolitan genera, the third (*Dipsas fusca*) to a tropicopolitan genus, the fourth and fifth (*Dendrophis punctulata* and *Cerberus australis*) to East Indian ones; for the sixth (*Myron Richardsonii*) a separate genus was established, but it is closely allied to the East Indian *Hypsirhina*. The genus *Elaps*, represented by a different form, *Vermicella*, is so far from being capable of being united with the East Indian forms, that it is nearer to those of the Neotropical region. Thus if we except three species and the *Hydridæ*, which are subjected to quite other physical conditions, we have in the Eastern Palæotropical region a fauna of Ophiidians as widely different from the nearest one of the East Indies as from all the other ones. It must be mentioned, that there is no snake known for the present from New Zealand. I say, for the present; for not many years since a total absence of Serpents in all the numerous isles of the Pacific Ocean was believed in.

V. Nearctic or North American Region (Regio Nearctica).

Characteristic forms.—*Charina*, *Wenona*, *Conopsis*, *Conocephalus*, *Carpophis*, *Osceola*, *Ninia*, *Lodia*, *Sonora*, *Rhinocilus*, *Tantilla*, *Simotes? coccineus*, *Ischnognathus*, *Helicops*, *Farancia*, *Dimades*,

Abastor, Virginia, Contia, Pituophis, Cenchris, Crotalophorus, Uropsophus, Crotalus.

Forms common with other regions.—*Heterodon, Coluber, Coryphodon, Herpetodryas, Cyclophis, Elaps.*

There is some difficulty in stating the southern boundary of this region; the Tropical fauna advances along the Isthmus of Panama, and extending over the again expanding part of Southern Mexico, it is gradually mixed with the Arctic fauna. And in these parts the fauna of the same latitude is the more mixed on account of the great differences of the elevation above the level of the sea, and the resulting great variety of climate in a small space; but as the climate gradually assumes the tropical character, so do also the vegetative and animal life. Nevertheless we have in the New World two quite different creations, radiating from the system of the Mississippi in the north, and from that of the Amazon in the south; and in each of those smaller provinces situated on the boundary between both regions, it will be a question, whether the larger number of its species belongs to northern or southern forms. As far as we are able for the present to judge, the tropic of Cancer may be considered as the boundary. No Snake is to be found north of the 60° N. lat., in a latitude where in the Palearctic region *Pelias berus* exists. But taking 6,500,000 square miles as the amount of the whole dry land in this region, and allowing seventy-five* species as peculiar to it, we have one species to every 87,000 square miles, or four species to the same area, for which we found only one in the Palearctic region. Thus this region indicates a much greater degree of intensity of species than the Palearctic region; but if it be stated that it surpasses also the Ethiopian region, this I consider as not an established fact, but only an appearance caused by the circumstance that North America has been much more fully explored than Africa. Even then, if we consider (according to Dr. Gray's system) *Charina* and *Wenona* to be *Boidæ*, the ratio of this section to the number of *Colubrina* is very small (1 : 18), the ratio between *Viperina* and *Colubrina* being large (1 : 5); in this respect this part of the fauna quite agrees with the same part of the Old World.

Among the non-venomous *Colubrina* the two families of *Calamariidæ* and *Natricidæ* offer the most generic and specific forms. The type of *Heterodon* is a North American form; but there is also one species to be found in South America.

Colubrina with grooved fangs in front can hardly be considered as pertaining to this region, only two species of *Elaps* reaching into the most southern parts. The Viperine Snakes are represented by most peculiar forms, all belonging to the family with a pit on each side of

* Without summing up the number of all the North American species described since the publication of the 'Catalogue of North American Reptiles' by Baird and Girard, 1853, I only mention that they describe therein 119 species. What I think of such species is shown by the synonymy of the North American Snakes in my catalogue.

the face: they exhibit all entire subcaudal shields (at least on the anterior part of the tail).

VI. Neotropical or South American Region (Regio Neotropica).

Characteristic forms.—†*Epicrates*, *Xiphosoma*, †*Corallus*, †*Boa*, *Eunectes*, **Chilabothrus*, **Ungalia*, *Tortrix*, *Streptophorus*, *Homalocranium*, *Elapomorphus*, *Elapocephalus*, **Arrhyton*, *Liophis*, *Stenorhina*, *Erythrolamprus*, **Hypsihynchus*, *Xenodon* (with smooth scales), *Uranops*, *Hydrops*, *Hygina*, **Gerarda*, **Hipistes*, *Ficimia*, †*Dromicus*, *Psammophis*? *lineatus*, *Thamnodynastes*, *Dipsas*? *cenchoa*, *Rhinobothrium*, *Leptognathus*, *Tropidodipsas*, *Scytale*, *Oxyrhopus*, **Elaps* (with fifteen rows of scales), †*Craspedocephalus*, *Lacheis*.

Forms common with other regions.—*Rhinostoma*, *Rhabdosoma*, *Tachymenis*, *Tomodon*, *Heterodon*, *Spilotes*, *Coryphodon*, †*Herpetodryas*, †*Philodryas*, †*Akætulla*, †*Dryophis*, *Leptodeira*, *Eudipsas*, *Dipsadomorphus*, *Dipsadoboa*.

If the number of species duly attributable to this region be reckoned at about 150, and its geographical area at 5,500,000 square miles, we have a single species to every 36,000 square miles, or nearly 2½ species to the same area, for which we found in the northern region a single one. As for intensity of species, this region is far surpassed by the East Indies, exhibiting only half as many species for the same area, and therefore showing itself proportionally far less productive of snakes than of birds. This fact will be very near the truth, as we know nearly equal parts of both regions. In the ratio of the different sections of snakes, South America does not agree with any other region, showing a ratio between *Boina* and *Colubrina* = 1 : 8, and between *Viperina* and *Colubrina* = 1 : 15. All the *Boina* have only a single row of subcaudal plates, whilst the other tropical regions exhibit such species with entire subcaudals as well as with two-rowed. Among the Colubrine Snakes, it is rich especially in those intermediate forms without prominent characters, the systematical arrangement of which is far from being complete.

Another character of the Region is, that true *Lycodontidæ* are wanting: they are replaced by *Scytale* and *Oxyrhopus*, in many respects similar to the East Indian *Lycodontidæ*, and forming a connecting link between these and the *Dipsadidæ*. All the venomous *Colubrina* belong to the genus *Elaps*, different from the East Indian species by having fifteen rows of scales and another system of coloration; one or two species range into the southern parts of the former region. Finally, all the *Viperina* exhibit a pit on the side of the face, two-rowed subcaudal plates, and the head covered with scales, thus being more closely allied to the greater part of the East Indian genera than even to those forms which we meet with in North America. One Viperine Snake with a rattle, *Crotalus horridus*, ranges into this region; but being also found in the more northern parts, and having the other relations in North America, it must be reckoned among those of the latter region.

Of the forms common with other regions there are found :—

1. In the Æthiopian region species of *Rhinostoma*, *Philodryas*, *Ahætuilla*, *Dryophis*, *Leptodeira*, *Dipsadoboa*—in fact all the species belonging to these genera show severally, according to the different region, such different characters as may be hereafter considered to be generic characters, if they are again to be found in other species of the same region ; and I wish therefore to point out a much greater difference between both regions than might appear by the number of forms mentioned as common. For instance, the South American species of *Rhinostoma* exhibit a posterior grooved tooth ; in *Rhinostoma cupreum* of Africa I found the same tooth not grooved ; if *Rh. occipitale* of Hallowell from Western Africa, or other species hereafter to be discovered, should prove to have also smooth teeth, I should consider it to be a character sufficient to separate the Neotropical species from those of the Western Palæotropical region. Not knowing the species of *Philodryas* from Madagascar, I refrain from giving my opinion in that respect.

2. In the Indian region species of *Rhabdosoma*, *Tomodon*, *Spilotes*, *Coryphodon*, *Dryophis*, *Eudipsas*, *Dipsadomorphus*,—I have already pointed out that South America exhibits in more than one respect similarities with the middle region of the Palæotropical ones ; and thus, except those forms which are represented in both regions by different genera, we have two genera truly common to them, *Rhabdosoma* and *Coryphodon*. The other genera I reckon of the same account as those mentioned as common with the Æthiopian region.

3. In the Palæotropical region one species of *Tachymenis*.

4. In the Nearctic region species of *Heterodon*, *Herpetodryas*, *Coryphodon*. The first two genera are limited to the New World, one exhibiting more species in the northern part, the other more in the south.

The Ophidians decidedly show that the West Indies are referable to the Neotropical region only. Hardly one species* is common to them and to the Nearctic region, and only the genus *Herpetodryas* might be considered such. On the other hand, many Southern continental species are again found in the West Indies ; and how many generic forms are common to both, the number of genera marked above with a cross (†) will represent. The genera peculiar to the West Indies, and marked with an asterisk (*), do not express a common peculiar character, and some of them are founded on relatively slight characters.

* Hallowell mentions *Ischnognathus dekayi* as found in Jamaica (Proc. Ac. Nat. Sc. Philad. 1856, p. 237).

SCHEMA OPHIDIORUM DISTRIBUTIONIS GEOGRAPHICÆ.

CREATIO NEOGEANA.	CREATIO PALÆOGEANA.
12,000,000 square miles, } = $\frac{1}{53,000}$.	33,000,000 square miles, } = $\frac{1}{80,000}$.
225 species,	410 species,

V.

Regio Nearctica,
6,500,000 square miles,
75 species,
= $\frac{1}{87,000}$.

I.

Regio Palearctica,
14,000,000 square miles,
40 species,
= $\frac{1}{350,000}$.

VI.

Regio Neotropica,
5,500,000 square miles,
150 species,
= $\frac{1}{36,000}$.

II.

Regio Æthiopica,
12,000,000 square miles,
80 species,
= $\frac{1}{150,000}$.

III.

Regio Indica,
4,000,000 square miles,
240 species,
= $\frac{1}{17,000}$.

IV.

Regio Australiana,
3,000,000 square miles,
50 species,
= $\frac{1}{60,000}$.

The above Schema is brought to an accordance with Mr. Sclater's Schema of the geographical distribution of Birds; but in both schemes the calculations made as to the number of square miles to one species cannot be looked upon even as attempts at approximations in those regions, a part of which only has been explored by naturalists. Thus the large space of central Asia, between 250° and 300° W. long. and between 35° and 50° N. lat., is quite unknown—a space of about 3,000,000 square miles, which cannot be justly taken into account; and then we should have a ratio of 1 : 275,000. In the Æthiopian and Australian region, at least two-thirds of the area mentioned being unknown, we should have on the average a single species to 50,000 square miles for the former, and to 20,000 square miles for the latter region. In this way we arrive at least at a more accurate idea of the series in which the regions follow one another, as to their respective richness in forms:—

1. Indian region 1 : 17,000.
2. Australian region 1 : 20,000 (instead of 1 : 60,000).
3. South American region 1 : 36,000.
4. Æthiopian region 1 : 50,000 (instead of 1 : 150,000).
5. North American region 1 : 87,000.
6. Palæarctic region 1 : 275,000 (instead of 1 : 350,000).

Thus by the consideration of the geographical distribution of Snakes we are obliged to acknowledge the views of the primary divisions of the earth's surface given by Mr. Sclater as those most natural. I have endeavoured always to state those facts which apparently contradict this view, as well as those which favour it; but, by stating the former, I intend rather to direct the attention of the systematist to such less satisfying results of his exertions, than to destroy the idea of primary ontological divisions. As, however, we do not know one species of Snakes extending fully over two regions, and as we find each region occupied by a majority of peculiar genera, we come to the inevitable deduction that these different forms of Snakes were created in the different parts of the world where they are now found; but it would be a too precipitate inference to maintain the same for all other species of the animal kingdom. As I said in the beginning of this paper, Snakes form a most stationary tribe among animals; but other animals are subjected to internal or external agencies by which they are necessarily spread, in a longer or shorter lapse of time, beyond their primary boundaries; and it is a great mistake, in such instances, not to admit the identity of species, even though it be modified into a climatic variety. How the Batrachians are related in this respect, and what are the most natural divisions of the earth's surface as to this part of the Reptiles, will be the subject of the Second Part of this paper.

PART II.

ON THE GEOGRAPHICAL DISTRIBUTION OF BATRACHIANS.

In the accounts given of the geographical distribution of animals, we find only a few general statements in which divisions of the earth's surface are characterized for their Batrachio-fauna. The presence of tailed Batrachians in the northern parts of the globe, the scarcity of Batrachians in Africa, gigantic forms between the tropics, and the abundance of Tree-frogs in South America, form the general results of those attempts. The faunas of some provinces were most accurately composed; but I am not aware that such an attempt has been extended through all the single parts of this suborder. The Batrachians are better adapted than are Snakes to range over large spaces; and this is especially observed with some Batrachians of the northern temperate part of the globe. *Rana esculenta*, *Bufo vulgaris*, and *Hyla arborea* are spread over the whole space of Europe and Asia, belonging to the Palæarctic region; Cantor found them again south of Japan, on the Chinese island of Chusan. *Rana temporaria* reaches beyond even these parts, being equally spread over the temperate regions of the New World. But none of the species are to be called *cosmopolitan*; and the differences between the different creations are such, that we have not even a true *cosmopolitan genus*. In looking for genera with the widest range, we may mention *Rana*, *Bufo*, and *Hyla*—the same genera which exhibit also the widest-spread species.

Bufo is wanting only in Australia; the most numerous and largest of its species are met with in Tropical America. *Rana* is entirely wanting in Australia, and represented in the most northern parts of Tropical America by a single species only; the East Indies and Africa produce most of the species, some from the former region being distinguished by their gigantic size, but rivalled by *R. mugiens* from N. America; some from the latter region being peculiar on account of very slender and long toes. *Hyla* is entirely wanting in the Æthiopian and Indian regions, and in the Arctic regions represented by only a few but widely-spread species,—Tropical America and Australia, on the other hand, producing an exceedingly great number of specific forms. Thus, in speaking of cosmopolitan genera in this paper, I mean those three genera severally, with the restrictions mentioned.

Such a difference, between the animal life of the New World and that of the Old, as pertains to other parts of the Animal Kingdom, is not to be observed in the Batrachians. Dissimilarity and similarity of the Batrachio-fauna depend upon the zones. Palæarctic and Nearctic regions resemble each other more than any third; the same is the case with Australia and South America; the Æthiopian region exhibits similarities with South America as well as with the East Indies, but more especially with the latter.

I. Palæarctic Region.

Characteristic forms.—*Pelodytes*, *Discoglossus*, *Alytes*, *Pelobates*, *Bombinator*, *Salamandra*, *Sciranota*, *Pleurodes*, *Bradybates*, *Ellip-*

soglossa, *Geotriton*, *Onychodactylus*, *Triton*, *Euproctus*, *Sieboldia*, *Proteus* *.

Cosmopolitan genera excepted, we have only one genus common with another region—*Polypedates*.

We may assign to this region 15 species of tailless Batrachians and 30 of the *Urodela*, which gives on the average a single species to each 300,000 square miles. The region is distinguished by the production of a part of the tailed Batrachians, a group of the animal kingdom which must be considered peculiar to the Arctic regions both of the New and Old World†; and although the species of *Urodeles* of the New World must be considered as types of different genera, yet the families exhibit representatives in both the regions. Some of the species of Batrachians are known to be extremely local (*Pelodytes punctatus*, *Pelobates cultripes*, *Sieboldia*, *Proteus*); but other species and genera are spread over the whole space of this region, proving in the most striking way the natural extent of this primary division. There is not a single tailed Batrachian known from Tropical Africa; but north of the Atlas we find *Salamandra maculosa* and *Pleurodes waltlii*, both inhabitants of Europe, and also a peculiar species, *Euproctus poireti*. As far as we know the western parts of Asia, belonging to this region, we meet species of Batrachians with all the characters of the true inhabitants of Europe; and what forms we should find in the centre and in the eastern parts by a better knowledge of these countries, is easily to be inferred by a glance on the fauna of Batrachians of Japan. There we find:—

Rana rugosa.

— *esculenta*.

— *temporaria*.

Bufo vulgaris.

Polypedates schlegelii.

Hyla arborea.

Ellipsoglossa.

Geotriton fuscus.

Onychodactylus.

Triton subcristatus.

Sieboldia.

Of the twelve species of these islands, five are identical with species in Europe, and one (*Triton subcristatus*) belongs to a European genus. Three genera of *Urodeles* are peculiar to Japan, *Sieboldia* being more closely allied to *Menopoma* from America than to any other genus. *Polypedates schlegelii* is a single representative of an East Indian genus, species of which, however, are also met with in Madagascar. Thus we find in Japan a ground which is supplied from a tropical region with Snakes, and from an arctic one with Batrachians.

II. *Æthiopian Region*.

Characteristic forms.—*Dactylethra*, *Tomopterna*, *Heteroglossa*,

* Respecting the new denominations, I refer to my 'Catalogue of Batrachia Salientia in the Collection of the British Museum,' which will shortly be published.

† I quite agree with those naturalists who think the characters of *Cæcilia* and *Lepidosiren* sufficient for forming separate classes of *Vertebrata*.

Stenorhynchus, Arthroleptis, Schismaderma, Hemisus, Breviceps, Chiromantis, Hyperolius, Leptopelis, Brachymerus.

Forms common with other regions.—*Cystignathus, Hylarano, Polypedates.*

There are nearly 60 species known, all belonging to the *Anura*, which number would give a single species for every 200,000 square miles, or for each 70,000 square miles if we are allowed to refer the number of species only to the area of the more- or less-known parts,—a ratio which shows the great progress of our knowledge during the last few years. This region was said to be especially poor in Tree-frogs; and the reason for this was an overstated poverty of trees. The genus *Hyla* is here replaced by *Hyperolius*—as abundant in species as, or even proportionally more than *Hyla*: one species, *Hyla aubryi*, was believed to be a representative of true *Hyla*; but a closer examination has shown that even this species differs from it by having cylindrical diapophyses of the sacral vertebra, forming a separate genus, *Leptopelis*. If we add the other Ethiopian Batrachians living on trees, we find the number of the *Platydictyla* nearly one-half of that of the *Orydictyla*—quite in accordance with the observation made on the Snakes of this region. There are so very few species of Batrachians known from Madagascar, that we are not yet enabled to compare its fauna of Batrachians with that of the continent; but, again, all are peculiar to this island.

III. Indian Region.

Characteristic forms.—*Oxyglossus, Leptobrachium, Megalophrys, Ceratophryne, Asterophrys, Uperodon, Diplapelma, Kalophrynus, Ixalus, Rhacophorus, Micrhyala, Kaloula.*

Forms common with other regions.—*Hylarana, Polypedates, Cornufer, Platymanthis.*

The Indian region, in comparison with the *Æthiopian*, does not exhibit a greater abundance of Batrachians such as we found to be the case with Snakes. The number of species is nearly the same. This is the more to be wondered at as the climate of the East Indies might be supposed to be most adequate to the life of *Anura*, and most productive of specific as well as of generic forms and of individuals. Moreover, the East Indies are comparatively well known; and the collection of the British Museum contains such a complete series of East Indian Batrachians, as considerably to increase the number of the species formerly known. But nevertheless the fact appears to be, that this region is excessively productive of individuals (especially of certain species, as in Snakes), but that it is not in the same way rich in generic, and still less in specific forms. There is some resemblance in this respect to the *Palæarctic* region. We may state 60 as the number of species, which gives a single species to every 66,000 square miles.

All the Batrachians belong to the *Opisthoglossa*, not the half of which are *Platydictyla*. The true *Hyla* are wanting, and, as in Africa, replaced by genera without dilated processes of the sacral ver-

tebra. Ceylon is comparatively rich in species; but as in general the Batrachians are adapted for spreading over a much greater space than other reptiles are, we do not find such a peculiar fauna of them in this island. The following species are known to be found in Ceylon:—

<i>Rana kuhlii.</i>	* <i>Ixalus variabilis.</i>
— <i>vittigera.</i>	*— <i>leucorhinus.</i>
— <i>tigrina.</i>	*— <i>pæcilopleurus.</i>
— <i>hexadactyla.</i>	— <i>aurifasciatus.</i>
— <i>malabarica.</i>	<i>Polyped. microtympaum.</i>
<i>Bufo melanostictus.</i>	— <i>maculatus.</i>
*— <i>kelaartii.</i>	*— <i>eques.</i>
	<i>Kaloula pulchra.</i>

Only those species marked with an asterisk are peculiar, the others exhibiting not even remarkable varieties.

IV. Australian Region.

Characteristic forms.—*Myobatrachus*, *Limnodynastes*, *Chiroleptes*, *Heleioporus*, *Uperoleia*, *Pseudophryne*, *Chelydobatrachus*, *Litoria*, *Pelodryas*.

Forms common with other regions.—*Cystignathus*, *Hylarana*, *Cornufer*, *Platymantis*.

Of thirty species which are known to belong to this region, we have on the average a single species to each 100,000 square miles, and therefore only to each 33,000 square miles of the known part of Australia and its islands. Just the half of the species are *Opisthoglossa platydactyla*.

Australia produces one Batrachian without a tongue; and if there should be known such a Batrachian from the Indian region, all the *Aglossa* would be equally distributed through the Tropical world, each part producing a peculiar type, viz. Africa the genus *Dactylethra*, South America the genus *Pipa*, Australia that of *Myobatrachus*. Secondly, this region is distinguished by the total absence of true *Ranidae* and *Bufo* *idæ*. Among other characteristic forms, *Pelodryas* especially deserves to be mentioned, representing the genus *Phyllomedusa* of the New World, but distinguished by a web between the toes. *Hylarana* extends in one variety of *H. erythræa* to the islands of the Pacific (S. Christoval); but the geographical distribution of this genus is far from being known. On *Cystignathus*, see the notice given in the sixth Region. Finally, *Cornufer* and *Platymantis* respectively are known by two species, one of which belongs to islands of the Indian Archipelago, and the other to some of the Pacific. Thus the Batrachio-fauna of this region, though offering well-distinguished generic forms, does not exhibit characters so general that a peculiarity of the whole could be expressed as we found it with Snakes. At present there is not one Batrachian known from New Zealand.

V. Nearctic Region.

Characteristic forms.—*Scaphiopus*, *Acris*, *Pseudacris*, *Notophthalmus*, *Taricha*, *Xiphonura*, *Ambystoma*, *Cylindrosoma*, *Desmognathus*, *Desmodactylus*, *Batrachoseps*, *Spelerpes*, *Oedipus*, *Ensatina*, *Axolotes*, *Protonopsis*, *Amphiuma*, *Menobranchus*, *Siren*, *Pseudobranchius*.

Forms common with other regions.—*Cystignathus*, *Engystoma*.

Schlegel, by trying to establish parallels between North and South America, was, I think, unfortunate in looking for respective representatives of both regions: parallels may be established between the Palearctic and Nearctic region which are far more true and interesting.

If we allow 20 species of *Anura* and 50 of *Urodela* for this region, we have on an average one species to every 90,000 square miles, or about three species for the same area for which we found only one in the Palearctic region. This greater abundance is due to a greater number of *Anura* as well as of *Urodela*; but if the Nearctic region has three times as many *Anura* as the Palearctic in proportion to its area, it yet produces four times as many *Urodela*.

By repeated examinations of a great number of specimens I have convinced myself that the North American frog, called *Rana sylvatica*, does not form a distinct species from the *Rana temporaria* of the Old World. It is true that there may be found more differences than those of colour only, by examining a few specimens (for instance, in the size of tympanum); but if we look to a greater number of specimens, and compare them especially with those from the eastern parts of Asia, even those differences will be found to be levelled. Among those species which are the most common we always find the greatest variations in form and colour. Among the European specimens themselves were found greater differences than those between European and American ones; and naturalists were induced to establish several species even for the European forms. The extremes of the variety *Rana oxyrhina* might be taken at the first glance for *Rana esculenta*; but on comparing them with other specimens of the same locality, we soon come to the point where it is impossible to decide to what form the specimen belongs. Likewise any naturalist, before whom might be placed one of the above-mentioned specimens from Eastern Asia, would be at a loss to determine whether it were from the Old World or from the New. But are we at liberty to separate species or genera only according to the soil where the beings are born, without finding sufficient external or better anatomical characters? As the palæontologist endeavours to show what organic forms reappear in a stratum above or below another, and where a new creation begins, so the zoologist must do in the horizontal distribution of animals on the earth's surface. Our *Rana esculenta* is represented by *Rana hallowellii*: specimens of the former exhibit sometimes quite the same coloration as that constantly found in *R. hallowellii*; but they invariably differ in the struc-

ture of the vocal organs. *Bufo vulgaris* of the Old World is represented in North America by *B. lentiginosus*, in South America by *B. chilensis*—all sufficiently distinguished by the structure of the skull. *Hyla arborea* has its representative in *H. euphorioides* from the table-land of Central America. Thus we find one of our most common *Anura* to be the same in the New World, and three others represented by closely allied species. Our fifth common species, *Bombinator igneus*, is a more local species, and has no representative in North America. No species of the *Urodela* is common to both regions, not even a genus; but in both we have not only such genera as are assigned by their structure either to living in water or on land, but also those intermediate forms which cannot be justly brought to one or the other category. Among the *Urodela* with free gills or gill-openings, *Sieboldia* exhibits at least such similarities with *Menopoma*, and *Proteus* such with *Menobranchus*, that they may be well considered as representing one another in the two regions. Thus we find the Nearctic and Palearctic regions nearer allied in respect to Batrachio-fauna than they are to any other.

Cystignathus and *Engystoma* severally exhibit one species in the southern parts of North America, those genera belonging, in fact, to the Tropics.

VI. Neotropic Region.

Characteristic forms.—*Pipa*, *Pseudis*, *Calyptocephalus*, *Cyclo-rhamphus*, *Pithecopsis*, *Limnochelis*, *Hylorkina*, *Pyzicephalus*, *Ceratophrys*, *Leiperus*, *Pleurodema*, *Alsodes*, *Phryniscus*, *Brachycephalus*, *Rhinoderma*, *Atelopus*, *Engystoma*, *Otilophus*, *Elosia*, *Crossodactylus*, *Phyllobates*, *Hylodes*, *Nototrema*, *Opisthodelphys*, *Trachycephalus*, *Phyllomedusa*, *Hylaplesia*, *Rhinophrynus*.

Form common with other regions.—*Cystignathus*.

There is on the northern boundary of this region the Batrachio-fauna mixed with Arctic forms, which is also the case in other parts of the animal kingdom, without taking into account those animals which, living on mountains, find by this vertical elevation the condition of a more northern climate. The absence of the genus *Rana* may be pointed out as a character of this region; one species, however, which I think I have recognized as *R. Lecontei* of Girard, reaches, together with *Hyla versicolor*, into the South of Mexico, and is found in localities with *Bufo granulosus*, *Hylaplesia*, and *Rhinophrynus*. *Bufo chilensis* ranges along the western coasts to California. But putting aside these examples, we meet, on entering Mexico, that Batrachio-fauna, by the abundance and peculiarity of which this region is widely distinguished beyond all the others. There we meet the greatest number of species of *Bufo* and *Hyla*, and those peculiar tree-frogs with a pouch on the back for their progeny; and there also we meet the single representative of the *Proteroglossa*. This region is the most productive in Batrachians, as we find the East Indies to be in Snakes. At least 110 species are known, giving one species for every 50,000 square miles, rather more than one-half of them belonging to the *Platydictyla*. South America pro-

duces one peculiar form of the Batrachians without tongue, *Pipa*—the more characteristic of this region, as it is, moreover, provided with pouches on the back, which are never met with in animals of any other part of the earth. If such a Batrachian were found in Australia (as I think will be realized), a strange point of analogy with the distribution of the Marsupial Mammals would be afforded.

We find in several families genera which are distinguished by peculiar development in the structure of certain bones of the skeleton, especially of the bones of the skull: *Calyptocephalus*, *Ceratophrys*, *Cystignathus*, *Brachycephalus*, *Otilophus*, *Opisthodelphys*, *Trachycephalus*. Numerous are those forms of *Oxydactyla* as well as of *Platydictyla* which have no web between the toes, and which are in general peculiar to tropical regions. Two-thirds of the genus of *Hyla* are found in Tropical America.

The genus *Cystignathus*, which I have mentioned as common to several regions, has most of its species in South America. Tschudi has separated a part of it by the name of *Pleurodema*, containing only South American species; I have done the same, uniting moreover a part of the Australian species under the name of *Limnodynastes*, whilst the other part, I find, has received a third generic name. But there remain still for *Cystignathus* South American and Æthiopian species; and these in fact, together with the separated species, form a very natural group—of genus or family—which is spread over the Tropics, but not met with in the East Indies. If, on review, we ask to which of the other Tropical regions the Batrachio-fauna of South America is the most closely allied, we find that region to be Australia. Both regions agree in producing severally one Batrachian without tongue, and in producing *Cystignathidæ*, *Hylidæ*, and *Hylina* with paratoids, which forms are all wanting in the East Indies; they also agree in the absence of the large genus *Rana* and of the *Polypedatidæ**. On the other hand, there is hardly one point of view in which we could find a relation between the Australian and East Indian regions; and thus the fact appears to be established, that Australia offers far more similarity in the Batrachio-fauna with S. America than it does with the East Indies, on the western coasts as well as on the eastern, and also that the real intensity of species corresponds more with that in South America.

The West Indies exhibit a Batrachio-fauna the character of which quite agrees with that of S. America: there is, however, a greater separation of the species, a few only being identical with those of the continent; and the genus *Hylodes* may be considered nearly as peculiar to these islands.

I now give a Schema similar to that for the Ophidians.

* There is in each region a single species; in South America *Elosia*, in New Guinea *Cornufer unicolor*.

SCHEMA BATRACHIORUM DISTRIBUTIONIS GEOGRAPHICÆ.

CREATIO NEOGEANA. } $\frac{1}{12,000,000}$ square miles, }
 180 species, } $\frac{1}{66,000}$.

ORBIS TERRARUM. } $\frac{1}{45,000,000}$ square miles, }
 380 species, } $\frac{1}{120,000}$.

CREATIO PALÆOGEANA. } $\frac{1}{33,000,000}$ square miles, }
 200 species, } $\frac{1}{165,000}$.

V.

Regio Nearctica,
 6,500,000 square miles,
 70 species,
 $\frac{1}{90,000}$.

I.

Regio Palaearctica,
 14,000,000 square miles,
 45 species,
 $\frac{1}{300,000}$.

VI.

Regio Neotropica,
 5,500,000 square miles,
 110 species,
 $\frac{1}{50,000}$.

II.

Regio Æthiopica,
 12,000,000 square miles,
 60 species,
 $\frac{1}{200,000}$.

III.

Regio Indica,
 4,000,000 square miles,
 60 species,
 $\frac{1}{66,000}$.

IV.

Regio Australiana,
 3,000,000 square miles,
 30 species,
 $\frac{1}{100,000}$.

If we, finally, try to refer the number of species to the area of each region according as it is more or less known, the regions, according to their respective richness of forms, will stand thus:—

1. Australian region = 1 : 33,000.
2. Neotropical region = 1 : 50,000.
3. Indian region = 1 : 66,000.
4. Æthiopian region = 1 : 70,000.
5. Nearctic region = 1 : 90,000.
6. Palearctic region = 1 : 250,000.

2. DESCRIPTIONS OF *MONOHAMMUS BOWRINGII*, *BATOCERA UNA*, AND OTHER LONGICORN COLEOPTERA, APPARENTLY AS YET UNRECORDED. BY ADAM WHITE, ASSISTANT, ZOOL. DEPART. BRIT. MUS.

(Annulosa, Pl. LIII.)

One of the most interesting Beetles found by John Bowring, Esq. in Hong-Kong is the very pretty species described below. Although Mr. Bowring has been for nearly fifteen years in that Chinese Island, and, as far as the management of immense commercial affairs would allow him, has been an active collector, he has only twice seen this curious Longicorn. It is somewhat allied to a small North Chinese species (*Monohammus luridus*) described by Mr. Pascoe; and to a North Indian species (*Monohammus melanosticticus*, White), in which there are five transverse bars of small black spots; and to one figured in 'Linn. Trans.' vol. xviii. t. 40. f. 7.

Insecti hujus nomen specificum est in honorem Domini Johannis Bowring, amici descriptoris, in Sinica insula Hong-Kong degentis. Valde amat Coleoptera. Collectio sua magnifica fere nationalis est.

MONOHAMMUS BOWRINGII, n. s. (Pl. LIII. fig. 1.)

M. brevisculus brevipilosus, pilis caput, thoracem, elytra corpusque subtus tegentibus pallide viridibus, subæruuginosis; oculis nigerrimis; thorace supra nigro trimaculato; elytris maculis plurimis nigerrimis depilatis subquadratis in quatuor series transversas ordinatis, basi, inter humerum nigrum et scutellum gibbere subverrucato nigro; antennis nigris, articulis basi pilis brevibus cæruleis annulatis, corpore subtus immaculato, pedibus viridibus, tarsis tibiisque pilis cæruleis indutis.

Long. lin. 7-8½.

Hab. Hong-Kong.

MONOHAMMUS CHAMPIONI, n. s. (Pl. LIII. fig. 2.)

M. subelongatulus miniaceo-sanguineus brevipilosus; thoracis spina macula laterali strigaeque media longitudinali nigerrimis; elytris singulis maculis 9-14 nigris pilosis disperse maculatis, corpore subtus nigro in lateribus singulis miniaceo plagatis; antennis nigris, articulo primo (apice nigro excepto) miniaceo

piloso, articulis ceteris basi subpubescentibus, pedibus nigris, femoribus pedum 1-2 subtus minime pilosis.

Long. lin. $10\frac{1}{2}$ -11.

Hab. In China boreali (Shanghai).

Somewhat allied at first sight to *Monohammus ruber*, Hope, from Silhet, described and figured in the 'Linnean Transactions,' and now common in collections.

The present soldier-costumed species I have named after Colonel Champion, who was mortally wounded at Inkerman, and died afterwards at Scutari. The Gazette, that reached the Crimea after his death, carried out the news of his promotion to Lieut.-Colonel, for distinguished services in the field. Colonel Champion is known to many a naturalist as one of the most amiable of men, and as an excellent botanist and entomologist. His memoir on the Flora of Hong-Kong, in the 'Botany of the Voyage of H.M.S. Herald,' his paper on Chinese Plants, in the 'Linnean Transactions,' and his papers in the 'Entomological Magazine,' under the name of "Ionius," describing the habits of Insects noticed by him in Corfu, are all much appreciated. I remember well his sober, but ever-constant quiet enthusiasm, and his liberal donations of insects to the Museum Collection. We looked forward to our Turkish, Greek, and S. Russian collections being greatly added to. But his allotted time on this earth had come; and Major Champion fell on the field of Inkerman, at the head of his regiment. Professor Lindley has published a brief memoir of him, which I once saw for a few minutes, and which gave some pleasing descriptions of his decision of character and of his amiability. My excellent friend Mr. Murray published a striking sketch of him in the 'Edinburgh New Philosophical Journal' for 1855, pp. 302-307. Colonel Champion studied wild plants and insects in Corfu, Ceylon, and Hong-Kong, and was a modest, retiring man, with keen powers of observation. It would be well if other officers would follow his example in this respect.

BATOCERA UNA. (Pl. LIII. fig. 6.)

B. pilis perbrevis albidis submarginaticeis dense tecta, antennis pedibusque obscurioribus; elytris costulis duobus longitudinalibus ante apicem coadunatis et desinentibus, parte basali elytrorum verrucis parvis dispersis, in lateribus crebrioribus.

Long. unc. 2 $\frac{1}{2}$ -3.

Hab. New Hebrides (where it was collected by John Macgillivray, Esq., the able naturalist who was out with H.M.SS. Fly, Rattlesnake and Herald).

Closely allied to *Batocera Hercules*, figured by Boisduval in 'Voy. Astrolabe.' The joints of the antennæ have a tendency only to that scabrosity and spininess which gives the name of *Batocera Rubus*, or the "Bramble-branch Long-horned Beetle" to one of the species. The specific name is from the heroine of Spenser's 'Faëry Queene,' the "woful," gentle, white-clad Una.

ACMOCERA FERRUGINOSA, n. s. (Pl. LIII. fig. 8.)

A. ochraceo-grisea ferrugine tincta; fronte nigra; antennarum articulo basali nigro, crasse punctato; thoracis lateribus singulis bituberculatis, dorso tuberculis duobus distantibus; elytris singulis basi medio carina abbreviata supra tuberculata; humeris scabriusculis; elytris apice emarginatis, dorso lineatim subtuberculato.

Densely covered with small hairs; an ochrey grey, tinged here and there, especially on the elytra, with rust-like markings and stains; the front of the head is black; the basal joint of the antennæ is black and rather roughly punctured; the fourth joint of the antennæ is longer than the third; all the joints except the first are of an ochreous grey at the base, and tinged with ferruginous at the tip; the thorax is palest on the middle, the back of it has two tubercles which are somewhat distant from each other; the sides have two tubercles close to each other, the posterior the larger; on the back are two longitudinal rusty lines: the sides of the scutellum are tinged with rusty; the elytra are each emarginated at the end, the surface has many small tubercles arranged in lines; the tubercles are larger on the shoulders, and before it and between the shoulder and the suture is an abbreviated considerably raised keel, which is tubercled on the upper edge; the legs and under side are ochrey-grey dotted with brown; the sides of each segment of abdomen beneath with a large rusty spot; the tibiæ tinged with rusty behind.

Length $9\frac{1}{2}$ lines.

Hab. Port Natal (Coll. Gueinzus). In Coll. Brit. Mus.

ACMOCERA TRIANGULARIS, n. s.

A. canescens; thoracis lateribus nigris; elytris singulis basi medio tuberculo elongato cristato; elytris lateribus macula mediana nigra triangulari postice albo-cincta et post medium partem fascia curtula nigra ad suturam; antennis cinereis nigro-annulatis.

Hoary, a black band between the eyes with two white spots, side of head behind the eyes black; thorax above with three small tubercles, two in front and one in the middle; each side with a largish blunt tubercle, the sides black; elytra in the middle at the base with a longish tubercle, which is crested above; down the middle is a ridge; the side about the middle has a large triangular black mark, margined behind with white; behind the middle across the suture is a short black band, only separated from the side spot by a narrow white line; near the tip are two small black marks connected by the margin; under side grey, sides spotted with black; tarsi with the two basal joints above cinereous; the other joints black.

Length $5\frac{1}{2}$ lines.

Hab. Port Natal (Coll. Gueinzus). In Coll. Brit. Mus.

AFLOCNEMIA BISPECULARIS, n. s.

A. obscure fusca; thorace maculis duabus nigris rotundatis cinereo cinctis; elytris punctis paucis pallidis.

Of a dull brown; the thorax with two black rounded marks margined with cinereous; elytra punctured, and with a few palish dots arranged in two indistinct transverse bands, and a white dot before; legs spotted with brownish.

Length $6\frac{1}{2}$ lines.

Hab. E. Indies. Coll. Brit. Mus.

In the general form allied to *A. nubila* rather than to *A. curculionoides*.

CACIA GRISELLA, n. s.

C. cinereo-fusca punctata, sutura et margine elytrorum punctulatis, fascia grisea undata mediana antice et postice fusco marginata.

Of an ashy-brown, thickly punctured, the suture and margin of the elytra punctulated with brown; across the middle of the elytra there is a greyish waved band, in front and behind margined with brown. Head, in front and on the crown down the middle with an impressed line; legs and antennæ brownish, base of the joints of the latter greyish, the former with short greyish hairs.

Length $4\frac{1}{2}$ lines.

Hab. Hong-Kong (*J. C. Bowring, Esq.*). Coll. Brit. Mus.

CACIA ANTENNATA, n. s.

C. griseo-fusca, elytris fascia nigro-fusca ante et altera cinerea post mediam partem; antennis fuscis, articulis tertio, quarto, sexto, octavo et duobus ultimis basi cinereis; pedibus griseis fusco maculatis abdominis segmentis pilis ochraceis ciliatis.

Greyish-brown, the elytra before the middle with a deep brown transverse band somewhat contracted at the suture, behind it a greyish band margined behind with deep brown, and punctulated in the middle with brown; abdomen with the posterior segments ciliated with ochreous hairs; legs greyish spotted, especially on the femora, with brown; antennæ brown, the basal joint slightly thickened at the end, and on the outside somewhat ridged, the third, fourth, sixth, eighth, and two last joints cinereous at the base.

Length 7 lines.

Hab. Java. Coll. Brit. Mus.

CACIA LATIFASCIATA, n. s.

C. nigra, capite thoraceque supra ochraceo lineatis; elytris fascia mediana lata ochraceo-fusca cinereo-variegata; basi et apice ochraceo-punctulatis; abdomine subtus medio nigro; pedibus nigris, tibiis medio ochraceo annulatis.

Brownish-black; head in front ochraceous, dotted with black, an impressed line down the front and over the crown; top of head black, No. CCCLXXII.—PROCEEDINGS OF THE ZOOLOGICAL SOCIETY.

with three ochreous lines ; thorax black, with five longitudinal ochreous lines, the two on each side of the central one interrupted with black ; scutellum black, with an ochreous spot at the base and another at the tip ; elytra somewhat roughly and distantly punctured, the base and apex black, spotted and marked with ochraceous ; the centre with a wide ochreous-brown band varied with greyish, in front and behind undulated and margined with black ; under side black, spotted and varied with ochraceous ; hinder side of abdomen black in the middle ; tibiæ with a widish ochreous ring round the middle ; antennæ, three first joints black varied with ochreous, ciliated behind (the others are broken off).

Length 7-9 lines.

Hab. N. China (Shanghai) (Coll. Fortune). Coll. Brit. Mus.

PHYMASTERNA LEUCOSTICTICA, n. s. (Pl. LIII. fig. 3.)

P. nigra ; *elytris maculis plurimis parvis albis, singulis subquadricostatis mesothoracis lateribus pilis albidis confertis tectis ; abdominis segmentis lateribus cinereo marginatis.*

Black, head with scattered cinereous hairs ; thorax very smooth above, sides below the recurved lateral spines varied with two or three spots of greyish hairs ; elytra at the base rounded and somewhat produced behind ; surface of each punctured and obscurely four-ribbed ; the punctures behind the shoulders, running together, cause the surface there to be somewhat rugose ; black, with many small white marks formed of hairs ; sides of thorax beneath covered with white adpressed hairs ; margins of abdominal segments behind edged with cinereous hairs ; legs with scattered cinereous hairs.

Length $4\frac{1}{2}$ lines.

Hab. Sierra Leone (Rev. D. F. Morgan). Coll. Brit. Mus.

PHYMASTERNA SENILIS, n. s.

P. nigra, pubes delicatula cinerea tecta ; thorace lævi, elytris punctatis, humeris et basi profundis ; basi medio sinuato.

Black, covered with a slight cinereous pubescence ; cheeks ochraceous ; thorax very smooth ; elytra punctured, more deeply at the base, but more especially on the shoulders ; the base in the middle sinuated ; abdomen down the middle black, the sides cinereous.

Length 8 lines.

Hab. Sierra Leone (Rev. D. F. Morgan). Coll. Brit. Mus.

DIASTOCERA CATHERINA, n. s. (Pl. LIII. fig. 4.)

D. elongata, angusta, cinerascens-nigra ; thoracis marginibus anticis posticisque purpureo-rufis ; elytris albido delicatulo punctulatis singulis fasciis 7-8 purpureo-rufis angustis interruptis ornatis ; femoribus et tibiis purpureo-rufo vittatis ; abdomine subtus purpureo-rufo transversim quadrifasciato.

Elongated, narrow, greyish-black ; head in front and margin of eyes varied with purplish red ; antennæ black, sprinkled with greyish hairs ; thorax in front wider than behind ; the fore and hind edges

margined with purplish-red, the rest black, rather thickly varied with short grey hairs; the lateral margins with two slight plaits; elytra elongated, narrow, greyish-black, thickly punctured, the punctures filled with small grey hairs, which give the elytra the appearance of being thickly dotted with whitish; across them are from seven to eight interrupted narrow purplish-red or pinkish bands, the apex margined with pinkish-red; the mesothorax with a large reddish patch coming down on each side; abdomen beneath with four transverse pinkish bands, one on each posterior margin of the segment; femora above with a longitudinal pinkish vitta and a smaller one beneath; tibiae with a longish patch of pink.

Length 15 lines.

Hab. S. Africa. Coll. Brit. Mus.

Dedicated to Miss Catherine Spooner, of Kentish Town, the elegant and amiable artist who drew the Plate on which this insect is figured.

CERATITES PIPERITA, n. s.

C. nigra, albido creberrime punctulata; thorace transversim sulcatulo: elytris rude punctatis, basi intus haud elevatis.

Purplish-black, the elytra very thickly punctulated with white; thorax with many transverse furrowed lines, having corresponding ridges; elytra rather roughly punctured, the base not ridged as in *C. jaspidea*, nor having like it the portion at the base of the suture somewhat elevated; under side with many small tufts of greyish hairs, the posterior margin of abdominal segments rather thickly ciliated; legs rather thickly covered with short cinereous hairs.

Length 10½ lines.

Hab. S. Africa (*Sir Andrew Smith*). Coll. Brit. Mus.

CEROSTERNA JAVANA, n. s.

C. ferrugineo-fusca; humeris excavato-punctatis, punctis postice subtuberculatis.

Allied to *C. gladiator*, but of a brown approaching to ferruginous, the apex of the joints of the antennæ darker; middle portion of thorax between the spines somewhat wrinkled; elytra with the shoulder and space about it covered with deep excavated punctures, most of them somewhat tuberculated behind; elytra in some parts varied with paler patches.

Length 13 lines.

Hab. Java. Coll. Brit. Mus.

CEROSTERNA PLAGIATA, n. s.

C. cervino-fusca sericea, antennarum articulis, a tertio, apice nigro-fuscis, cervice nigro-punctata; thorace supra pallido trivittato; scutello lateribus pallidis; elytris singulis basi subtuberculatis, plaga magna laterali subquadrata pallida, maculisque variis parvis pallidis, una post mediam, majore.

Silky fawn-coloured brown; the back part of head with two or

four brown spots, sometimes obsolete; antennæ with the joints from the third to the end tipped with brown; thorax above with three pale vittæ, the sides of which are jagged; on each side of the central one, before the middle, there is a small round dot; the lateral spine is sometimes surrounded by the side vitta; the scutellum has the side margins pale; the elytra are somewhat tuberculated at the base; there is a large pale squarish patch on the side of each elytron before the middle, and several small scattered spots besides; there is a largish pale spot behind the middle, and two others between it and the tip, but these spots vary in the specimen, and sometimes run into each other; under side rather paler than the upper: each segment of the abdomen has a small brown spot on the side.

Length 9–13 lines.

Hab. E. Indies (*Walter Elliott, Esq.*). Coll. Brit. Mus.

CEROSTERNA TESSELLATA, n. s.

C. ochracea, sericea, antennarum articulo basali nigro; thorace supra vittis duabus nigris distantibus strigaeque nigra laterali, elytris nigro maculisque ochraceis variegatis, scutello et spatio triangulari ad basim communi suturæ ochraceo, elytris singulis maculis tribus magnis subrotundis ochraceis; pedibus corporeque subtus ochraceis.

Ochreous yellow, sometimes of a lighter, sometimes of a darker hue; head yellow, with a black mark behind the eye, connected with a waved streak to the side of it; thorax above with two distant longitudinal vittæ, widest in the middle; each side with a narrow black streak running through the spines; scutellum and a triangular space behind it at the base of the suture yellow; each of the elytra varied with black and with small yellow spots, the tip yellow; there are three largish somewhat round yellow spots, one placed before the middle of each elytron, the second behind the middle, and the third before the tip and received into a notch of the yellow space; legs and under side yellow, femora slightly tipped with black; antennæ with the basal joint black, the other joints yellowish ferruginous; most of the joints tipped with dark brown.

Length from $7\frac{1}{2}$ to $9\frac{1}{2}$ lines.

Hab. E. Indies. Coll. Brit. Mus.

CEROSTERNA IMITATOR, n. s.

C. nigra, antennarum articulis apice basique cinereo annulatis; thoracis dorso supra maculis quatuor subochraceis; elytris singulis basi lævibus, maculis paucis depressis pilis subochraceis tectis; corpore lateribus subtus plagis magnis subochraceis ornato; pedibus pube cærulescenti tectis.

A species allied to *C. farinosa*, but may at once be distinguished from it by the following characters:—the front of the head is slightly marked with white, a short white band on each side close to the eye; the lower part of the cheek has a patch of short ochrey-coloured hairs; the joints of the antennæ, beginning with the third, are nar-

rowly ringed with ash-coloured hairs at the base and at the apex ; the thorax above has four slight ochraceous marks, two in front and two behind ; each of the elytra at the base is smooth, or with only one or two instead of many as in the *C. punctator* ; the surface has a few depressed spots larger than in the other, and covered with ochraceous hairs ; the under side of the thorax and the abdomen with large spots of ochraceous hairs ; legs slightly bluish from a delicate pubescence with which they are covered.

Length 16 lines.

Hab. N. China (Shanghai) (Coll. Fortune). Coll. Brit. Mus.

ANOPLOSTHETA JARDINEI, n. s. (Pl. LIII. fig. 5.)

A. pilis fulvis densissime induta, thoracis dorso plagis duabus magnis cretaceo-albis, plagis singulis marginibus nigris et externe (quoad situm) rectis, interne rotundatis ; elytris singulis plagis tribus cretaceo-albis, basali subcordata lobo interno cordis elongato ad basin ; plaga mediana subtriangulari, plaga apicali subelongato-triangulari ; thoracis abdominisque lateribus cretaceo distincte plagiatis.

Long. unc. 1, lin. 1.

Hab. Africa mer. Coll. Plant. in Mus. Brit. Coleopteron hoc pulchrum, Domini Gulielmi Jardine, Baronetti, de prisca gente Scotica, nomen fert.

This fine, very distinctly marked, species of the genus was sent to the Museum by the late Mr. Plant. I saw a specimen forwarded to Dr. Baird by Sir William Jardine, Bart., the distinguished Scottish naturalist ; I have named it in compliment to one who has laboured so long, so assiduously, and so successfully, in making his favourite subject popular. His edition of White's 'Selborne,' in 'Constable's Miscellany,' made many a one who read, about 1830, familiar with that delightful observer. His 'Naturalist's Library,' and his more scientific Ornithological, Ichthyological, and Palæontographical works are all highly appreciated. Of late years the Baronet of Applegirth (of that ancient family, the Jardines) has attended much to Entomology.

This species has no inconsiderable resemblance to *Cerosterna margaritifera*, Melly, an Indian species figured by Westwood.

MONOHAMMUS ARMATUS, n. s.

M. nigro-fuscus, elytris singulis spinis 8 magnis suberectis, dorsalisibus antennis subferrugineis.

Of a deep blackish-brown, the elytra varied with many small dull ochrey spots formed of short hairs ; head slightly punctured in front at the base of the antennæ ; antennæ with the basal joint above slightly striated across, deep brown, the third and following joints subferruginous, the tips dark brown ; thorax above somewhat rough with three small tubercles, two transverse placed before the other ; scutellum covered with ochreous hairs ; elytra with two or three small spines about the shoulders, and with eight large strong outstanding

spines, arranged in four oblique lines, the first solitary, the second (with two spines) before the middle, the third (with three spines) behind the middle, the fourth (with two spines) a little behind the third line; legs deep brown, tibiæ rather paler.

Length 9 lines.

Hab. Silhet. Coll. Brit. Mus.

MONOHAMMUS LARVATUS, n. s.

M. ater, capite lineis quatuor albis, in genis brevibus, in lateribus frontis, elongatis, macula triangulari inter oculos et post basin antennarum, antennis articulis 5-8 albis, quarto basi albo, apice nigro, elytris punctatis; maculis plurimis albis, humero intus excavato et postice directo; pedibus et abdomine subtus pilis cinereis vestitis.

Black; the head in front with two white lines widely separated from each other, each cheek has a shorter white band; behind the notch which separates the antennæ there is a triangular patch of white hairs divided down the middle by a slight raised line; antennæ have the first and second joints and the third at the base of a reddish brown, the tip of the third joint is black, the base of the fourth joint is white, the greater part of the joint being black; the fifth, sixth, seventh, and eighth joints are white, the terminal joints are brown; the thorax is in front shortly ciliated with white, the back is covered with very small tubercles, the hind margin, except in the middle, is narrowly margined with white; the sides of the scutellum are margined with white hairs; the elytra have the shoulders furnished with an abrupt knob, which extends backward and is hollowed out on the inside; elytra punctured, at the base slightly tuberculated; covered with short inconspicuous black hairs, and varied with a great many small white spots formed by patches of short hairs; under side of body and legs with short greyish adpressed hairs; the second, third, and fourth segment of the abdomen narrowed. The sternum projects between the middle pair of legs.

Length $10\frac{1}{2}$ lines.

Hab. India (Coll. Children). Coll. Brit. Mus.

MONOHAMMUS STEPHANUS, n. s.

M. nigro-fuscus, capite punctato, vertice linea transversa sex punctorum luteorum; thorace supra vittulis quatuor longitudinalibus luteis, medianis abbreviatis; elytris singulis linea obliqua alba, antice incrassata, apice subochraceo et linea plagam magnam triangularem velutinam fuscam fere cingente.

This species is allied to *M. crucifer*, but differs from it somewhat in form, the thorax and elytra being rather narrower; it is of a deep brown, the head and first joint of the antennæ are punctured; on the back part of the head is a transverse line formed of six small yellowish spots, behind which is a black line indented in front; thorax above roughish, with points and with a few transverse wrinkles in the middle, with four obscure longitudinal yellowish lines, one over

each spine, and two abbreviated in the middle; scutellum with deep yellow hairs; elytra at the base scabrous, with small tubercles and with a few patches of deep yellow hairs; on each elytron is a large triangular deep velvety brown mark, the fore-edge with a transverse white line, thickened at the end next to the margin, behind edged with pale, and the space between the spot and the tip somewhat ochraceous, varied with brownish; legs and under side brown, with distant scattered greyish hairs.

Length 11 lines.

Hab. E. Indies. Coll. Brit. Mus.

MONOHAMMUS MELANOSTICTICUS, n. s.

M. pallido cinereo-viridis; articulis antennarum apice fuscis; elytris singulis lineis sex transversis macularum nigrarum.

Thickly covered with pale ashy-green pubescence, the antennæ at the apex brownish; a black spot on the cheek to the side of the eye; the thorax with three black spots placed transversely; elytra rounded at the apex, each with six transverse rows of small squarish black spots, the base somewhat tubercled and punctured. Under side and legs covered with pale ashy-green pubescence; the mesothorax with a blackish spot on each side.

Length $7\frac{1}{4}$ to $8\frac{1}{4}$ lines.

Hab. N. India. Coll. Brit. Mus.

MONOHAMMUS GEORGIUS, n. s.

M. cinereo-fuscus, sericeus; capite inter antennis fesso, antennis subochraceis, articulis apice fuscis; thorace lineis quatuor obscuris longitudinalibus ochraceis, sulcis duobus transversis; scutello ochraceo in medio linea lævi; elytris apice rotundatis, basi tuberculatis, singulis costis quatuor obscuris, spatiis inter costas punctatis, et variegatis nigro et ochraceo; fascia transversa quatuor guttarum ochracearum ante apicem; apice ochraceo maculato et sublineato, abdomine subtus, latere singulo, lineis duabus macularum.

Of an ashy-brown, the elytra with a silky pile; head between the antennæ cleft; behind the cleft two ochreous bands; antennæ ochreous, the joints at the tip brown; thorax black, varied with ochreous and with four rather obscure ochreous bands, two in the middle and one on each side over the spine, with two transverse shallow grooves; scutellum ochreous, with a smooth line down the middle; elytra at the base tuberculated, each with four indistinct costæ, the space between punctured and varied with small ochreous spots and a few velvet-like black spots; between the middle and the tip there is an arcuated transverse line formed of three or four longish ochreous spots; the front of each has a velvet-like black spot; near the tip, where the costæ converge and are lineated with ochreous, there is a hooked range of small ochreous spots often con-

verging; the under part of abdomen with two lines of ochreous spots on each side.

Length 9 to 13½ lines.

Hab. Silhet.

MONOHAMMUS FREDERICUS, n. s.

M. nigro-fuscus, fronte ochraceo-maculato, vertice ochraceo bilineato; thorace subangustato supra transversim aciculato, lineis quatuor ochraceis interruptis; elytris apice rotundato singulis basi subtuberculatis, tuberculis in lineis tribus indistincte ordinatis; lineis tribus valde interruptis macularum flavarum et nigrarum femoribus ad apicem annulo ochraceo; corpore subtus nigro, flavo maculato.

Allied to *M. Georgius*, but may be distinguished by the thorax being narrower and delicately aciculated across; the front is spotted with ochreous, and on the cheek is a short yellow band; on the crown of the head and between the notch are two slender yellow lines; the elytra are, at the base, tubercles, the tubercles close to each other and somewhat arranged in three lines; on each elytron are three lines of distant velvet-black spots with occasional yellow marks, which, behind the middle, are blotched together; the antennæ, elytra, and legs are darker; the femora have a ring of yellowish hairs just before the tip, and the under side of the body is black and marked with yellow spots, arranged on the abdomen in four lines.

Length 10½ lines.

Hab. Assam. Coll. Brit. Mus.

MONOHAMMUS TESSERULA, n. s.

M. ferrugineo-fuscus, capite, antennarum articulo basali pilis ochraceis variegatis; thorace supra medio vittis duabus distinctis fulvo-ochraceis; elytris apice rotundatis lineis sex ferrugineis punctatis alternatim ordinatis cum lineis quinque albis, maculis nigris tessellatis, corpore subtus subochraceo nigro vermiculato.

Ferruginous-brown, elytra tessellated with white and black and ferruginous; head and first joint of antennæ varied with ochrey hairs, the other joints at the base ashy-brown, at the tips dark brown; thorax above somewhat rugose, with two wide and distinct tawny-yellow bands down the middle; elytra at the base somewhat tubercular; the surface of each with six ferruginous lines punctured with black, and alternating with five greyish-white lines, which are tessellated with black; body beneath somewhat ochraceous and slightly vermiculated with black.

Length 7 lines to 11½ lines.

Hab. China (Hong-Kong) (*J. C. Bowring, Esq. and Major Champion*). Coll. Brit. Mus.

MONOHAMMUS OFFICINATOR.

M. ferrugineo-fuscus, pilis densis vestitus, thorace medio nudo et transversim striato, elytris apice rotundatis basi subtuberculato, singulis maculis duabus pallide flavis, una ante, alia post mediam partem elytri, elytris punctis parvis flavis et ochraceis; elytris post scutellum paullo depressis.

M. officinator, Dej. MSS. Coll. Chevr.

Ferruginous-brown, clothed with a dense pile; thorax in the middle with a slight bare space, transversely striated; elytra at the base covered with many small tubercles, behind the scutellum and on the suture slightly depressed, with many small scattered yellow and ochreous spots; each elytron has besides two larger pale yellow spots, differing in size in different specimens, surrounded with a darker colour, the first somewhat oblique and before the middle, the second behind the middle; underside and legs uniform ferruginous-brown.

Length 11 to 12 lines.

Hab. Assam.

MONOHAMMUS BRIANUS, n. s.

M. niger, thorace supra vittis tribus albis, una mediana; scutello albo; elytris singulis apice truncatis, maculis 8 marginalibus et suturalibus, plagiisque quatuor albis in medio elytri, tertio biangulato; lateribus corporis subtus albo plagiatis, segmentis abdominis postice albo ciliatis.

Black; thorax above with three white vittæ, one in the middle, one on each side above the spine, the side below the spine with a widish white band; scutellum white; each of the elytra truncated at the tip, the margin with four white spots, the suture with three, and one before the tip; down the middle are four largish white patches, one at the base, the third shaped like a Z; under side of thorax and body with a long white band.

(Head wanting in the specimen.)

Length of thorax and elytra 9 lines.

Hab. Nepal (B. H. Hodgson, Esq.). Coll. Brit. Mus.

MONOHAMMUS NIVOSUS, n. s.

M. ferrugineo-fuscus, sericeo-velutinus, fronte et antennis canescentibus; thorace subtuberculato; scutelli lateribus nigro-fuscis, apice truncato; elytris sericeo-canis basi, et lateribus ferrugineo-fuscis, apice fusco, vitta laterali intus bisinuata; corpore subtus et pedibus ferrugineo-fuscis, sericeis; elytris singulis apice rotundatis.

Of a ferruginous-brown, with punctured, almost foveolated, elytra; front of head pale, whitest on the margins; antennæ pale; thorax somewhat tuberculated, punctured; scutellum short, truncated, sides very dark brown; elytra of a satiny grey at the base, a slight patch at the tip, and a widish band on the side (which is bisinuated on the inner margin), ferruginous brown, and the apex of each elytron

rounded; under sides and legs ferruginous-brown silky, the knees greyish.

Length 9 to 10 lines.

Hab. Ceylon (*F. Layard, Esq.*), India? Coll. Brit. Mus.

MONOHAMMUS SUBCRUCIATUS, n. s.

M. pallide fuscus, elytris griseo subcruciatis et punctatis; thorace supra subtuberculato et punctulato, spina laterali subcurvata; thorace medio postice pallide lineato, scutello pallido; elytris apice intus obliquis.

Near *M. obfuscatus*, the head is shorter and the eyes are larger; the thorax above is somewhat tuberculated and punctulated, the lateral spine on each side somewhat hooked backwards, a short palish line on the back part of the thorax, scutellum pale; elytra pale brown, punctured, with a large greyish cross-shaped mark, each of the elytra at the apex obliquely cut inward.

Length $8\frac{1}{2}$ lines.

Hab. China (Hong-Kong) (*J. C. Bowring, Esq.*). Coll. B. M.

MONOHAMMUS SUBLINEATUS, n. s.

M. griseus fusco tinctus; antennarum articulis apice fuscis, capitulis vertice lineis. laevi; thorace supra lineis duabus nigro-fuscis postice convergentibus; elytris griseis, fusco longitudinaliter sublineatis, plaga mediana nigro-fusca.

Griseous and tinged with brown; joints of antennæ brown at the tip, greyish at the base, the first joint brown speckled with greyish; head brownish, a smooth impressed line between the antennæ and extending to back part of head; thorax above with two deep blackish-brown vittæ converging behind; elytra somewhat truncated at the tip, greyish, and each with at least four longitudinal brownish lines, at the base blackish-brown and tubercled, a large blackish-brown silky patch touching the margin, but not the suture, transverse in front and oblique behind; legs and under side tinged with brown.

Length 9 lines.

Hab. Silhet.

MONOHAMMUS SIERRICOLA, n. s.

M. griseo-cinereus, capitis fronte et vertice ferrugineo tinctis; thoracis dorso plaga magna nigro-fusca, postice ferrugineo maculata, spina supra ferruginea; elytris elongatis macula communi quadrata fusca ante mediam; ante apicem fascia transversa nigro-fusca in suturam postice currente; elytris singulis apice truncatis et ferrugineo ciliatis.

Of a grizzled grey; the head in front and the crown tinged with a yellowish ferruginous; the front with a short brown line crossed at the top by a wider line, sides of head grey; antennæ with the first joint grey on the outside, brown on the inside, and yellowish

ferruginous at the tip, other joints greyish ochreous at the base, brown at the tip; thorax above in the middle with a very wide dark brown band occupying the greater part of upper surface; it has a yellowish patch on its hinder portion; above the spine there is a short line of a yellowish ferruginous hue, between that and the dorsal patch is a narrow short obscure line; the elytra are elongated and of a grizzly grey; the shoulder is tinged with ferruginous; before the middle there is a large squarish brown spot on the suture common to both elytra, it is margined on the side with ferruginous; before the tip there is a transverse blackish-brown band, which at the suture extends to the tip: the under side is griseous, the abdominal joints marked behind with blackish-brown; legs brown and griseous, the soles of tarsi and the joints tinged with ferruginous yellow.

Length $10\frac{1}{2}$ lines.

Hab. Sierra Leone (*Rev. D. F. Morgan*). Coll. Brit. Mus.

MONOHAMMUS OBFUSCATUS, n. s.

M. fusco-griseus, antennis canescentibus, capite medio linea lævi, thorace medio linea lævi abbreviata et vittis duabus nigro-fuscis obscuris; elytris basi scabriusculis, singulis maculis duabus nigro-fuscis una basali ad suturam recta, altera ad mediam subcurvata sericea, apice subtruncatis et subemarginatis; corpore subtus pedibusque ferrugineo-cinereis.

Allied to *H. sublineatus*. The antennæ are of a greyish hue; the thorax has an abbreviated smooth line down the middle, on each side of it is an obscure vitta of a deepish brown; the base of the elytra is somewhat scabrous; the apex is somewhat truncated and slightly notched; each has two dark brown marks, the first is straight and rather near the suture, the other is silky and somewhat curved near the middle; the legs and under side are of a greyish ferruginous.

Length 10 to 11 lines.

Hab. China (Hong-Kong) (*J. C. Bowring, Esq.*). Coll. B. M.

MONOHAMMUS ASPERULUS, n. s.

M. griseo-fuscus, elytrorum humeris acutiusculis, basi medio elevato, basi plaga magna fusca communi; elytris post mediam partem, macula sericeo-velutina fusca, antice fissa, pedibus et corpore subtus nigro punctatis.

Of a greyish-brown; head with scattered black punctures; thorax on the upper side with five small tubercles, one in the middle larger than the others, the front and back part of the thorax and two lines on the back with black punctures; elytra with a short longitudinal elevation at the base, serrated on the top, a large triangular brown mark at the base, common to both elytra, beyond the middle of each a deep brown velvet-like mark deeply notched in front; the suture before the tip is bordered with deep silky brown; the general surface is somewhat roughened and punctured; the legs and under side

of the body are punctulated with black; the elytra are rounded at the tip.

Length $9\frac{1}{2}$ to 11 lines.

Hab. Port Natal. Coll. Brit. Mus.

PTYCHODES HONDURÆ.

P. olivaceus, ore supra sulphureo marginato, capite vittis tribus pallide sulphureis, una verticali, una singulis lateribus; thorace vittis tribus pallide sulphureis, una dorsali, una lateribus singulis, dorso transversim striatulo; scutello pallide sulphureo; elytris apice acuminatis spinosis; elytris vitta suturali communi sulphureo ante apicem desinente; elytris singulis vitta laterali pallide sulphurea, mesothorace macula laterali sulphurea; abdominis segmentis quatuor basalibus linea sulphurea.

Olive, punctured, face above the mouth margined with pale yellow; head with three pale yellow vittæ, one on the crown and a wider one on each cheek, a slight yellow mark at the bottom of the notch of the eye; antennæ ferruginous brown, the three basal joints darker; thorax above slightly striated across with three pale yellow vittæ, one down the middle, and one rather wider on each side, in the same line with those on cheek and side of elytra; scutellum pale yellow, elytra with a narrow yellow band on the suture, but not extending to the tip: the inner margins of it are toothed; the sides of the elytra have a rather wide pale yellow band, the margins are somewhat toothed; each side of the mesothorax has a pale yellow spot; the first four segments of the abdomen have a pale yellow line below; the last segment of the abdomen has a small slight spot on each side.

Length 12 lines.

Hab. Honduras. Coll. Brit. Mus.

CEREOPSIUS HELENA, White. (Pl. LIII. fig. 7.)

C. pilis brevibus creberrimis indutus, scutello, capite, thoracis partibus, abdominis segmentorum marginibus subtus pilis pallidioribus ornatis; elytris singulis, plagis duabus magnis nigris, plagulam elegantem irregularem sericeo-albidam, includentibus.

Long. unc. lin. 1.

Hab. Borneo (Coll. Horsburgh in Mus. Brit.).

Coleopteron hoc distinctum conjugis mæ carissimæ nomen fert; figura picturam pulchriter notatam entomologis monstrabit.

Thorax with lateral spines, not so far back as in Mr. Pascoe's pretty species *Cereopsius exoletus*, from Sarawak; the transverse groove, behind front, rather deep and free from much pile, a depressed space on the back between spine, narrower in middle in front, and with a slightly emarginate protuberance behind; the elytra deeply punctured at the base, with a few scattered punctures, a very slight bulge at the base on each side of the pale hair-covered scutellum; each elytron has a large black patch, including the bulging,

but not very prominent shoulder, and passing from it to the suture diagonally, so as to leave a broad, subtruncated, triangular brown space at the base of both elytra, including the scutellum; this black space extends to before the middle, its hind edge is waved, a large pale testaceous irregular patch is included in it, arising from lateral edge, but not extending to the suture; it is of a pale yellowish silky white, and its well-defined edge makes the contrast with the black background singularly pleasing; behind the middle of each elytron is an oval black patch, not extending to the suture, and at some distance from the tip it has another white silky spot, well-defined; the elytra are somewhat truncated at the tip, the outer point of truncature being slightly apiculated; the hind margins of the abdomen beneath are edged with lighter-coloured pile.

A distinct species of the genus *Cereopsis*, whose name has been changed by Mr. Pascoe to *Cereopsius*, that it may not be confounded with Latham's Cere-billed Goose from New Holland—*Cereopsis*. As Mr. Pascoe has changed the name, I retain his modification, not because I deem it necessary. The strong and long first joints of the antennæ, placed near each other at the base, and separated by a notch, are well-marked; they are of a rich brownish-red colour.

3. FIRST STEPS TOWARDS A MONOGRAPH OF THE CÆCIDÆ, A FAMILY OF ROSTRIFEROUS GASTEROPODA. BY PHILIP P. CARPENTER.

History of the Group.

The remarkable Mollusks here described long escaped observation, from their extreme minuteness. The *Dentalium minutum* of Linn. (ed. 12, no. 1264), described as from the Mediterranean, "testa tam parva, ut genus nisi armatis oculis non conspiciatur," may possibly be the *Brochina glabra*, as supposed by Hanl. (F. & H. Brit. Moll. vol. iii. p. 181), though the same author prefers assigning it to the young of *Ditrupa gadus* in his Ips. Linn. Conch. p. 439. This is also supposed by Milne-Edwards (Lam. An. S. Vert. vol. v. p. 599, no. 21). According to Dr. Fleming, "none of the shells of this genus were known to Linnæus. Mr. Boys discovered the *Cæcum imperforatum*, which was inserted by Mr. Walker in the genus *Dentalium*."

The British species, supposed to be three in number, were described (as *Dentalia*) by Montague, 1803, and by other writers on native shells; but Dr. Fleming was the first to point out their generic peculiarities. In the Edinburgh Encyclopædia, 1817, article "Conchology," he characterized *Cæcum* as "Shell tubular, cylindrical, sub-arcuated, undivided, and closed at the apex." This he placed between *Dentalium* and *Serpula*, as the 5th genus of his Order I. Univalves, Division I. Unilocula, citing three species, *C. imperforatum*, *trachea* and *glabrum*. In his 'Philosophy of Zoology,' 1822, he altered the

generic name to *Cæcalium*, which was adopted by Macgillivray in his Mollusca of Aberdeen.

Capt. Brown, in his Ill. Rec. Conch. Gr. Br., 1827, although writing from Edinburgh, took no notice of his predecessor's labours, except to cite his figures, and proposed two genera—one, *Brochus*, for the adult; the other, *Cornuoides*, for the early state of the same species. These are placed among Annelides as the third and fourth genera of the family *Maldaniæ*, characterized as having the "branchiæ of the animal intermediate; tube open at both ends." The very loose descriptions and inaccurate figures of this work render the identification of species extremely difficult; nevertheless, as in this British work is the first publication of foreign *Cæca*, it is necessary to analyse its contents. Aided by specimens of the supposed British shells in the collection of Mr. Alder, and by a tolerably comprehensive series of known West Indian specimens, the following is offered as a fair elimination of Brown's forms:—

Genus *Brochus*.

Species 1. *trachiformis*, Brown, = *Dentalium trachea*, Mont. British.

Species 2. *striatus*, Brown, (described as destitute of a knob, but figured with one), = *Dent. imperforatum*, Mont. = *trachea*, var. British.

Species 3. *reticulatus*, Brown, = *annulatus*, adolescent. West Indian.

Species 4. *annulatus*, Brown. A good species, but West Indian.

Species 5. *glabrus*, Brown, = *Dent. glabrum*, Mont. British.

Species 6. *lævis*, Brown, (erroneously quoted as the *Dent. imperforatum* of Walk. and Mont.), ? = *Dent. glabrum*, var. British.

Species 7. *arcuatus*, Brown, = *Dent. glabrum*, Mont., adolescent: v. infra. British.

Genus *Cornuoides*.

Species 1. *major*, Brown, ? = *Cæcum trachea*, jun. British.

Species 2. *minor*, Brown, = *Brochina glabra*, jun. British.

There is no evidence that the author had himself seen the shells he described from Walker's figures as *Cornuoides*. The same errors are repeated in the second edition (which is that cited in the following pages), bearing date 1844.

In 1828, Fleming in his Hist. Brit. An. p. 237, places his *Cæca* (postea *Cæcalia*) along with Foraminifera in the genus *Orthocera*, under Mollusca Cephalopoda,—a proceeding which Philippi characterizes as "horribile dictu;" but, without breaking up the tube, it was not worse to regard the plug with its knob as a chamber and siphuncle, than to disregard the plug altogether and treat the shell as a *Dentalium*. The same species are again cited, but not the same shells, the *Orthocera trachea* being the *Brochus annulatus* of Brown.

In 1834 (according to Bronn, 'Lethæa,' p. 985) Zborzewski de-

scribed the *Cæcum trachea* under the name *Odontina*, in the Mém. Soc. Nat. Moscou, vol. iii. p. 310, pl. 27. f. 5. This rare work had not been seen by Philippi; nor have I been able to meet with a copy containing the above citation.

In the celebrated Moll. Sic. Utr. vol. i. p. 102, 1836, Philippi redescribes the *Cæcum trachea* as *Odontidium rugulosum*, and assigns his new genus a place among the Pteropods. This place is retained in vol. ii. p. 73, where he cites the English synonyms, and quotes Cantraine, who had previously figured the shell as a *Creseis*.

In 1842, Mr. Searles Wood catalogued four fossil species from the Coralline Crag, in the Ann. and Mag. Nat. Hist., for the first time directing attention to the shape of the plug as a guide in specific determination. In the Monogr. Crag Moll. (vol. i. of the important works published by the Palæontological Society), 1848, the species are further illustrated and figured, being arranged between *Vermetus* and *Litorina*. The types were presented to the British Museum, but without names.

Previously to the publication of Philippi's views, W. Clark, Esq., in 1834, had discovered the animal of *Cæcum trachea*, and ascertained its true relationships. It was not, however, till 1847 that he published his observations in the Ann. Nat. Hist. ser. 2. vol. iv. p. 180. In his Moll. Test. Mar. Brit., 1855, pp. 322-331, he minutely describes the animals of the two British species, resigning his MS. designation of *Dentalopsis*, and inserting Fleming's genus, with *Turritella*, in the family *Vermetidae* *.

In 1851, the British species were carefully described and the animal of *C. trachea* figured in Forbes & Hanl. Brit. Moll. vol. iii. pp. 176-183. Prof. Forbes placed the genus in *Turritellidae*, and confirmed many of the observations of Mr. Clark. Mr. Hanley experienced difficulty in assigning Brown's species, saying that "the genus *Cæcum* has not been studied with that due attention to its foreign members which alone entitles us to pronounce upon what are the permanent characters by which its species are determinable." This want it is the object of the present paper to aid in supplying.

In the same year (Oct. 15th, 1851), Mr. Stimpson presented a Monograph of the species found in the United States, to the Bost. Nat. Hist. Soc. It is published in their 'Proceedings,' and contains descriptions of the shells of two species from Florida, and one from New England. In his 'Shells of New England' is given a figure of *C. pulchellum*, and an account of its animal (p. 36), agreeing in the main with Clark's observations on *C. trachea*.

In 1852, the late lamented Prof. C. B. Adams published his Monograph of the Shells of Panama in the 'Annals of the Lyceum of Nat. Hist. New York.' At pp. 160-163, 310, 311, eight supposed

* I have to record my greatest obligations to Mr. Clark for the kindness with which he has supplied me with the records of his laborious researches, and favoured me with perfectly fresh British specimens. A few of his observations (as, e. g., that ?*Stenea rota* = *Cæcum trachea*, jun.; that the young *Cæca* are fixed; that the operculum of *Brochina glabra* is analogous to that of *Siliquaria*) have not been confirmed.

species are described and arranged in the family *Litorinidæ*, between *Turritella* and *Chemnitzia*. According to the mode of diagnosis here adopted, five of these species are resolvable into one. The types are in the Amherst College Museum; but duplicate types of six were sent by the author to Mr. Cuming, and have supplied what was wanting in the descriptions. Prof. Adams recorded that he had found several species at Jamaica; but he did not describe them.

In Woodward's valuable 'Manual of Mollusca,' 1851, p. 133, the then accessible knowledge was condensed, and the genus placed in *Turritellidæ*, between *Aclis* and *Vermetus*.

In Dr. Gray's "List of Genera," P. Z. S. 1847, p. 203, no. 775, "*? Cæcum*" appears with its synonymy in Family *Cleodoridæ* (*Pteropoda**). In the 'Fig. Moll. An.' p. 85, the group first appears as a family, between *Scalariadæ* and *Truncatellidæ*. In the 'Guide Syst. Distr. Moll.' 1857, part i. pp. 100, 101, the family is placed between *Rissoidæ* and *Melaniadæ*, and the genus *Brochina* is instituted.

In Messrs. H. and A. Adams's 'Genera of Recent Mollusca,' now publishing, vol. i. p. 355, the family *Cæcidæ* is placed between *Turritellidæ* and *Vermetidæ*. In Philippi's 'Handb. Conch. & Mal.' p. 197, the *Cæcacea* appear as a family between *Vermetacea* and *Siphonariacea*.

The naturalists of France do not appear to have been acquainted with these shells till of late years; neither in the works of Lamarck, Cuvier, Sander Rang, D'Orbigny, nor Deshayes, is there to be found any notice of their existence. This is the more remarkable, as D'Orbigny paid no little attention to the minute shells of the West Indies and South America. It is true that Chénu has copied Brown's figures of *Cornuoides major* and *Brochus "tracheiformis"* in his 'Illustr. Conch.'; but it is hardly possible to recognize even the genus in them.

In the 'B.M. Cat. Maz. Moll.' pp. 312-329, were described, in August and September 1856, eighteen species of *Cæcum*, grouped under three heads according to sculpture, viz. *Elephantulum*, *Anellum*, and *Fartulum*. At the same time I prepared descriptions of the remaining foreign species. The whole have now been subjected to a rigid examination, after the study of about 1000 additional specimens, principally from Mazatlan, the West Indies, and Teneriffe. The best series of types of all the species at my disposal I have presented to the British Museum. These will aid future students in correcting the errors into which I have doubtless fallen, not from want of patient care, but of materials and judgment. Other series of types are prepared for public museums in America and on the Continent.

Station and Geographical Distribution.

The established European species are only two in number—*Cæcum trachea* and *Brochina glabra*; but these have been found from Scotland to the Mediterranean. The living specimens have been taken

* See 'B.M. Cat. Pteropoda,' p. 3, no. 7, where the error is corrected.

in the Coralline zone ; but their favourite haunts have not been made known. Of these, the *C. trachea* is recorded as fossil in the Sub-appenine beds.

On reaching the Canaries, we lose the European species ; but at the great depth of 50 fathoms Mr. M'Andrew dredged many hundreds belonging to five species or varieties of the *Anellum* and *Fartulum* groups. They were all pure white and very fresh ; but most were pierced by Proboscidifers, and not one was found with its operculum. It is doubtful, therefore, whether the gravel-sand was their place of residence. No species has yet been found either on the Guinea Coast, at the Cape, or at Port Natal.

The tropical regions of America appear to be the head-quarters of the group, both for the number of species and of individuals. The only species which has been found living adheres to groups of *Fermeti* in the Laminarian zone. But the coarse sponge of commerce, known to be from the West Indian region by the shells which are found abundantly in it, as well as from the same *Cæca* being obtained in shell-sand from the Antilles, has supplied the principal part of the Atlantic species. Although most of the shells are dead, enough have been found with their opercula to prove that they live at no great distance. Here we find the handsome group *Elephantulum* ; here the most delicately sculptured forms in each division ; and here the abnormal genus *Meioceras*, presenting in the mode of growth a singular approach to *Fermetus*. It is remarkable that the type of this genus is also found fossil in Barbadoes, both in its young and adult state, in company with species still living in the island, but now of smaller size (*Dr. Cutting*). The European types are both found here sparingly ; but whether they are conspecific is not yet decided.

On crossing the peninsula, we find eighteen species belonging to the three groups of *Cæca*, all of which can be easily separated from the (perfect) West Indian forms. Here again the "analogue" of *Brochina glabra* occurs in limited numbers ; of its identity, even generically, it is vain to speak till the opercula have been found. Most of the Mazatlan *Cæca*, to the number of at least 1200, were found on breaking up the shells of large *Spondyli*, &c., where their form is peculiarly adapted to traversing the numerous worm-eaten passages in which they seem to reside *. Numbers were found in every stage of growth (one only, however, with the nuclear coils, which are extremely perishable), which materially aided in ascertaining the principles of specific variation ; and eleven species were found with their opercula, of which some were nearly flat.

The Indo-Pacific fauna appears as bare of *Cæca* as the American seas are rich. The *C. annulatum* reappears at Aden, and the *C. regulare* from Singapore and Australia : from the latter country we have a new species related to *Brochina glabra* ; and Japan has recently furnished us with two species, one at least distinct ; but

* A few, however, were found, with their opercula, among the sand from the Olivellas, &c.

among all Mr. Cuming's dredgings at the Philippines, not a single specimen has been found.

The earliest known appearance of *Cæcidæ* on our globe was in the Eocene epoch; three species having been found in the London clay, belonging to the remarkable type *Strebloceras*, which is as it were a permanently undeveloped *Cæcum*. In the Coralline Crag we have three species which have since perished, while the recent *B. glabra* appears to connect the ancient with the present condition of our seas. No species have been found in the Eocene tertiaries of the Paris basin (teste Deshayes, MS.); but one is said to have been described by Grateloup from the middle epoch*. In Italy, species have been found in the ?middle and later tertiaries; one of which is the *C. trachea*, now living in the same seas.

Specific Characters.

It is possible that all *Cæcids* are smooth, or nearly so, in their nuclear and first tubular stage, assuming the characteristic sculpture of the species either gradually or suddenly. The young shells are much longer in proportion, and generally more bent, than the adult; the ribs and rings are either crowded or loose according to circumstances; and the mouth is often either sharp or thickened, straight or slanting, according to age. To found species on shape and sculpture, therefore, is more hazardous than in most shells; but there is one character which, with certain slight exceptions, is found generally reliable. This is the shape (not the mere amount of prominence) of the plug, which, instead of being of homogeneous texture and simply flat or convex as in other septa-making and decollated univalves, always presents, in every successive stage of increase, the same marked peculiarities of form and the same striae of growth. This character having been generally overlooked by previous authors, fresh diagnoses have been written for all the known species, in order that, by the use of terms in the same sense, the forms might be more easily compared together. The *liræ* are longitudinal riblets from apex to aperture, corresponding with spiral sculpture in other shells; the *annuli* form the concentric or transverse sculpture. The *septum* is the plug covering the decollated portion; its *margo lateralis*, the profile when the shell lies on its side. The plug itself is either *ungulate*, when the whole surface rises gradually towards the back like a horse's hoof; or *mucronate*, when it tapers to a point; or *mamillate*, when it is rounded, without apex; or it is intermediate between these forms. The groups described under *Cæcum* can scarcely be regarded even as subgenera, so very gradually do they pass one into the other; but they are found convenient, to avoid the frequent repetition of characters, and to aid in the identification of species.

* Teste Desh. in lit. But Dr. Gray, who has kindly consulted for me the *Conchologie Fossile*, 1840, is unable to find any allusion to the genus.

All our knowledge of the animals being in the papers of Clark and Stimpson, it is not thought necessary to repeat their statements.

All the measurements are in decimals of an inch.

Family CÆCIDÆ, Gray.

*Testa nucleosa spiralis, postea tubularis, regularis, haud affixa :
apertura orbiculari.*

Operculum corneum, multispirale : margine haud fimbriato.

Turritellidæ, pars, Forbes, Stimps., Woodw.

Vermetidæ, pars, Clark.

Genus CÆCUM, Fleming.

*Testa nucleosa planata : animal una in plana solute orbiculari
crescens : testa animali crescente iterum iterumque decollata,
septo regulari, varie constructo, partem decollatam tegente ;
superficie seu annulata, seu lirata, seu lævi ; apertura plerum-
que primum constricta, postea expansa.*

*Operculum concavum seu subplanatum ; sutura sæpius linea ele-
vata instructa, interdum lævi.*

Syn. *Cæcalium*, Macgil.—*Brochus* + *Cornuoides*, Brown.—*Odon-
tina*, Zborz.—*Odontidium*, Phil.—*Cæcum*, Forbes & Hanl.—*Denta-
liopsis*, Clark, MS.—? *Corniculina*, Münster.*—*Dentalium*, *Orthocera*
seu *Crescis*, pars, auct.

The distinguishing characters of the restricted genus are (1) the frequently decollated, orbicular growth, the nuclear whirls being in the same plane as the adult ; and (2) the concave or flattened operculum.

Sect. A. ELEPHANTULUM.

*Cæca insigniora ; t. tereti, elongata, regulari ; adulta liris lon-
gitudinaliter sculpta ; apertura parum declivi.*

The shells in this group are like a minute *Dentalium elephantinum*, and are distinguished by their (comparatively) large size, tapering form, and longitudinal sculpture. They are for the most part rare.

1. CÆCUM SUBSPIRALE, Cpr.

*C. (Elephantulum) t. maxime elongata, lentissime augente, tenuis-
sime lirata, liris parallelis ; juxta aperturam annulo subtu-
mente ; septo mucronato, superficie subplanato, mucrone late-
rali, dextrorsum sito, parvo ; apice rotundato, subspirali :*

* The *Corniculina Ehrenbergii* of Münster, 'Beiträge zur Geognosie und Petrefacten-kunde des Südöstlichen Tirols,' 1841, pp. 118, 119. pl. 12. f. 3, a, b, c, is described and figured as a chambered Cephalopod, the siphuncle (? plug) seen at the narrow end being also described and figured at the larger opening. It is from the Middle Tertiaries of Castelurquato (Parma), and only half a line in length ; and is supposed by Mr. Woodward, *Man. Moll.* p. 133, to be an imperfectly observed *Cæcum*.

operculo concavo, tenui; anfr. plurimis, lira tenui spiraliter ascendente.

Long. test. jun. .05, lat. .007—.01.

Long. test. adult. .155, lat. .025—.03 (aperturam versus).

Hab. Mazatlan, rare. Mus. Brit. &c.

Maz. Cat. p. 315.

This is the largest known Cæcid, and easily recognized by the shape and the very peculiar plug, the apex of which appears like a minute *Vitrinella* set sideways on the otherwise flat surface. About twenty specimens were found.

2. CÆCUM ABNORMALE, Cpr.

C. (Elephantulum) t. curtissima, valde arcuata, tenuiore; lirulis tenuissimis circ. xxx., aperturæ tumenti supercuntibus; septo mucronato, prominente; mucrone obtusiore, omnino dextrorsum sito; margine laterali (i. e. hac specie dorsali) concavo, rapide ascendente: operculo? . . .

Long. .06, lat. .023.

Hab. Mazatlan, three sp. Mus. Brit. &c.

Maz. Cat. p. 316.

The shells of this species are extremely short, and yet so bent that the plug and the inside can be seen at once, while the apex of the plug is on the extreme right, so that the front view of the shell gives its profile.

3. CÆCUM INSCULPTUM, Cpr.

C. (Elephantulum) t. juniore vitrea, adulta solida; liris validis quadratis et interstitiis profundis ornata; aperturam versus haud tumente; septo unguato, subprominente, apice obtuso, paululum dextrorsum verso, margine laterali subrecto: operculo? . . .

Test. jun. long. .053, lat. .013—.017.

Test. adult. long. .133, lat. .023—.028.

Hab. Mazatlan, extremely rare. Mus. Brit. &c.

Maz. Cat. p. 315.

Known by the square ribs with deep interstices, and the unguulate plug.

4. CÆCUM LAQUEATUM, C. B. Ad. (diag. auct.).

C. (Elephantulum) t. gracili; lirulis circiter xx. haud acutis, interstitiis haud profundis; septo submamillato, submucronato; mucrone parvo, obtuso, subsinistrali; margine laterali convexo: operculo? . . .

Long. .11, lat. .028.

Hab. Panama, 2 sp. (C. B. Ad.). Mus. Amerst, Cuming.

C. B. Ad. Pan. Shells, pp. 162, 311, no. 215.

Known by the remarkable plug, which appears mamillate, but has a small apex projecting at the side.

5. *CÆCUM OBTUSUM*, Cpr.

C. (Elephantulum) t. elongata, tenue lirata; aperturam versus haud tumente; septo submamillato, parum tumente, apice obtusissimo dorsum versus spectante: operculo? . . .

Test. jun. long. .04, lat. .01—.014.

Test. adult. long. .132, lat. .017—.026.

Hab. Mazatlan, rare. Mus. Brit. &c.

Maz. Cat. p. 317.

About a dozen specimens were found of this species. The plug is mamillate in front, but unguulate behind.

6. *CÆCUM PLICATUM*, n. s.

C. (Elephantulum) t. curtior, longitudinaliter valde plicata; plicis xii.—xvi., acutis; apertura t. adolescente stellata, t. adulta annulata; interdum annulis indistinctis aperturam versus; plerumque superficie concentrice minutissime striata; septo mucronato, superficie subplanato, mucrone dactyliformi subiter ascendente, apice obtuso: operculo?

Test. adol. long. .07, lat. .01—.017.

Test. adult. long. .105, lat. .017.0—28.

Hab. Sponge, W. Indies. Mus. Brit. &c.

Thirty-eight specimens of this species were found, of which some were white; others orange, perhaps coloured by the sponge. It is known by its strong plications and finger-shaped plug. Two young specimens were found much straighter than the rest, and with the plications finer, which may belong to a distinct species.

Three dead specimens, received by Mr. Bean from the Mauritius, do not present any characters by which they can be separated from this species, except that the mucro is shorter, which is probably due to their being worn.

7. *CÆCUM LIRATUM*, n. s.

C. (Elephantulum) t. "C. mamillato" simili, sed liris creberrimis subobsoletis ornata; septo magis elevato.

Lat. .025.

Hab. Cor. Crag, Sutton. 1 sp. in Mus. Brit.

Only a fragment has been observed of this species, which is named as being the earliest known *Elephantulum*. It is to be hoped that those who are able to obtain access to the locality of Crag Cæca will investigate the species.

8. *CÆCUM LIRATOCINCTUM*, Cpr.

C. (Elephantulum) t. tenue lirata, liris plus minusve acutis, confertis seu subdistantibus; plerumque annulis obsoletis, sub liris monstrantibus; septo submucronato, subungulato; mucrone dactyliformi, apice prominente, laterali, acuto; margine late-

rali concavo : operculo valde concavo, anfr. circ. xii. ; lira prominente spirali, marginem quasi duplicante.

Test. jun. long. .047, lat. .017.

Test. adult. long. .14, lat. .02—.032.

Var. tenuilraturum : *t. liris crebris, tenuibus ; apice parum prominente.*

Var. subobsoletum : *t. alba, alabastro simili ; liris paucis interdum vix monstrantibus.*

? Var. subconicum : *t. septo maxime elevato, subconico.*

Hab. Mazatlan, rare. Mus. Brit. [? Singapore, 1 sp. Mus. Brit.]

Maz. Cat. p. 317.

Although about seventy specimens were found of this species (the least uncommon of the *Elephantula*), I cannot fix definitely the limits of the species, and one or more of the above varieties may prove distinct. The principal feature is the appearance of rings under the ribs.

A terminal fragment of an *Elephantulum*, picked out of mud in the burrow of a *Lithophagus* in an E. Indian *Plicatula* received from Singapore, presents no characters by which it can be separated from this species. Perfect specimens will, however, probably prove it to be distinct.

9. CÆCUM HEPTAGONUM, Cpr.

C. (Elephantulum) t. septangulata ; annulis rotundatis confertis cincta, angulos longitudinales supracurrentibus ; apertura planata, extus heptagonis forma, intus circulari, sulco concentrico ornata : septo? : operculo? . . .

Lat. .02.

Hab. Mazatlan. Mus. Brit.

Maz. Cat. p. 319.

Only a mouth-piece was found of this very remarkable species.

10. CÆCUM IMBRICATUM, n. s.

C. (? Elephantulum) t. haud parva, tereti ; primum laevi ; dein longitudinaliter multangulata, sulcis creberrimis, angustis concentricis quasi annulata ; adulta, liris longitudinalibus obtusis, angulatis viii.—xiv. polygonata, a sulcis concentricis xxv.—l. ut in adolescente interrupta ; apertura stellata ; septo subungulato, submucronato, plerumque valde prominente ; margine laterali subconcavo ; apice extante, latiore, marginibus dextrali et sinistro declivibus : operculo? . . .

Test. jun. long. .06, lat. .008—.014.

Test. adol. long. .087, lat. .012—.023.

Test. adultæ long. .11, lat. .017—.027.

Hab. Sponge, W. Indies. Mus. Brit. &c.

This extremely beautiful species (like *C. heptagonum*) is exactly intermediate between *Elephantulum* and *Anellum*. The sculpture

resembles a number of polygonal flat tiles piled one on another. The concentric sculpture is strongest in the young shell, the longitudinal in the adult. Thirty-three specimens have been examined.

Sect. B. ANELLUM.

Cæca typica; *t. adulta annulata*.

That this is the typical condition of the genus is shown by the tendency that shells in the other groups have to assume the ringed character, especially about the mouth.

11. CÆCUM ANNULATUM, Brown (diagn. auct.).

C. (Anellum) t. majore, elongata, solida; annulis validis xx.—xxx., rotundatis, extantibus, cincta, plerumque distantioribus, præsertim aperturam versus; lirulis longitudinalibus crebris, minimis, extantibus, et interstitia et annulos transeuntibus; septo mucronato, margine laterali concavo; mucrone subiter ascendente, valido, dactyliformi, subdextrorsum sito; t. juniore annulis acutioribus, lirulis obsoletis: operculo?

Test. jun. long. .053, lat. .008—.014.

Test. adolesc. long. .108, lat. .016—.035.

Test. adultæ long. .122, lat. .022—.035.

Hab. [South Coast of England (*Alder*); Killough, Lough Strangford, Ireland (*Brown*)]; W. Indies, sponge of commerce; *Adeu* (*Bean, MS.*). Mus. Brit. &c.

Brochus annulatus, Brown, Ill. Conch. Gr. Br. 1844, p. 125. pl. 56. f. 12.

+ *Brochus reticulatus*, Brown, *loc. cit.* p. 124, pl. 56. f. 11.

Cæcum annulatum, Forbes & Hanley, Br. Moll. vol. iii. p. 181. pl. 88. f. 7.

Orthocera trachea (pars), Flem. Hist. Br. An. 1828, p. 237 [non *Dentalium trachea*, Mont.].

The name *reticulatum* would have been far more characteristic of this beautiful species; but as it was given to the adolescent state, and *annulatum* to the adult, which is well figured in the Br. Moll., the latter is retained. Fifty-three specimens of various ages have been examined from the W. Indian sponge, and have been carefully compared with Mr. Alder's supposed British specimen. This has the posterior rings much closer than usual. The characteristic longitudinal threads, which reticulate both the rings and the hollows, are scarcely seen in the young shell, which, even in the earliest stages found, is distinctly and somewhat sharply ringed. In this state it is known from *C. regulare* by the very prominent finger-shaped mucro. Many adult specimens were found having an additional ring remaining beyond the plug; but even then the mucro is conspicuous.

The *Aden* specimens are too much rubbed to determine with confidence; but in the most perfect the characteristic finger-shaped mucro, the reticulated sculpture, and the thickened distant rings

near the mouth, will not justify specific separation merely on geographical grounds.

12. *CÆCUM ELONGATUM*, Cpr.

C. (Anellum) t. elongata, tereti; primum lævi, dein annulis rotundatis parum extantibus instructa, interstitiis minimis; septo unguato, apice parum elevato, subobtusio; margine laterali subrecto: operculo? . . .

Test. jun. long. .06, lat. .008—.017.

Test. adult. long. .103, lat. .015—.023.

? Var. *semilæve*. *T. huc et illuc annulata; huc et illuc lævi.*

Long. .112, lat. .025—.028.

Hab. Mazatlan, very rare. Mus. Brit. &c.

Maz. Cat. p. 319.

About a score of specimens were found, including the ? variety, which may be distinct. The shape approaches *Elephantulum*.

13. *CÆCUM SUBIMPRESSUM*, Cpr.

C. (Anellum) t. elongata, solidiore; annulis creberrimis, rotundatis, haud extantibus, interstitiis subimpressis; septo mucronato; margine laterali vix concavo; mucrone parvo, obtuso, ad dorsum sito: operculo concavo, linea elevata suturam definiente.

Test. jun. long. .058, lat. .008—.016.

Test. adult. long. .115, lat. .017—.03.

Hab. Mazatlan, very rare. Mus. Brit.

Maz. Cat. p. 320.

This species differs from *C. elongatum* in the narrow mucro. About a dozen specimens were found.

14. *CÆCUM PULCHELLUM*, Stimps.

C. (Anellum) t. satis elongata, solidiore, pallide fusca; t. adolescente gracili, annulis paucis distantioribus; t. adulta annulis circiter xxv. validis, rotundatis, interstitiis plus minusve æquantibus; septo? mamillato, haud extante; margine laterali parum convexo: operculo concavo, anfr. circiter viii.

Long. .1, lat. .025.

Hab. New Bedford Harbour, U.S., adhering to groups of *Vermeti* in laminarian zone.

Stimpson in Proc. Bost. Soc. N. H. Oct. 1851; Shells N. Eng. p. 36. pl. 2. f. 3.

The above description of the plug, which was not noticed by Stimpson, is supplied from the figure. If correct, it is the only *Anellum* known with a purely mamillate plug.

15. *CÆCUM TRACHEA*, Mont. (diagn. auct.)

C. (Anellum) t. haud parva, solidiore, rufo-fusca, haud opaca; t. juniore lævi; adolescente tereti; adulta cylindrica, annulis

creberrimis, xl.-l., *vix expressis*, *contiguis cincta*; *interstitiis parvis*, *minutissime longitudinaliter striulis ornatis*; *apertura acuta*, *vix declivi*, *vix contracta et postea expansa*; *septo sub-ungulato*, *submucronato*; *marginē laterali recto*; *apice sub-dextrorsum sito*, *obtusō*, *plus minusve elevato*; *operculo vix concavo*, *linea spirali elevata*, *anfr. circiter xv.*, *apertura æquante*.

Test. jun. long. .076, lat. .013—.018.

Test. adolesc. long. .128, lat. .015—.03.

Test. adult. long. .128, lat. .025—.032.

Variat *marginē laterali convexo*, *interdum tumēte*.

Hab. British Seas, in coralline zone (v. *Forbes & Hanl.*); Magnisi, near Syracuse, very plentiful in sand (*Philippi*); Piedmont (*Jeffreys*); N. and S. of Spain and Mediterranean (*M'Andrew*); fossil at Palermo (*Philippi*); Subappennine beds (*Horne*).

Dentalium trachea, Mont. Test. Brit. vol. ii. p. 497. pl. 14. f. 10; Maton & Rack. Linn. Trans. vol. viii. p. 239; Dillw. Rec. Shells, vol. ii. p. 1068; Brit. Mar. Conch. p. 5. f. 61; Wood, Ind. Test. ed. Hanl. p. 192.

+ *Dentalium imperforatum*, Ad. Micr. pl. 14. f. 8; Mont. *loc. cit.* p. 496; Mat. *loc. cit.* p. 238; Turt. Conch. Dict. p. 39; Brit. Mar. Conch. p. 4; Dillw. p. 1067; Wood, p. 192 (not f. 12).

= *Orthocera imperforata*, Flem. Brit. An. p. 237.

= *Odontidium rugulosum* (pars), Phil. Moll. Sic. vol. i. p. 102. pl. 6. f. 20; vol. ii. p. 73.

= *Creseis rugulosa*, Cantraine, p. 32.

= *Brochus trachiformis*, Brown, Ill. Conch. G.B. p. 124. pl. 56. 1. 10 (male).

+ *Brochus striatus*, Brown, *loc. cit.* (male), pl. 56. f. 13.

Brochus trachiformis, Chénu, Ill. Conch.

Cæcum trachea, Flem. Enc. Edinb. art. Conchology; Clark, Ann. Nat. Hist. series 2. vol. iv. p. 180; Forbes & Hanl. Br. Moll. vol. iii. p. 178. pl. 69. f. 4, & pl. KK. f. 1; Clark, Test. Mar. Brit. Ins. p. 327; Adams, Gen. vol. i. p. 355. pl. 38. f. 6, 6a; Jeffr. Mar. Test. Piedm. (Ann. Nat. Hist. Feb. 1856), p. 30; M'Andr. Rep. Moll. N. Atl. (Br. Ass. 1856) p. 149; Horne, Foss. Vien. & Subappenn. pl. 46. f. 19, a, b, c*.

+ *Cæcum imperforatum*, Flem. *loc. cit.*; Gray, Guide to Moll. B.M. part i. p. 100.

? jun. = *Serpula recta*, Walker, Flem. Enc. pl. 205. f. 8.

= *Cornuoides major*, Brown, *loc. cit.* pl. 56. f. 49; Chénu, *loc. cit.*

Although the name *trachea* was given to the tapering adolescent state of this typical species, and *imperforatum* to the adult, the former name has come into current use, probably because the other represents the generic and not a specific character. It is one of the

* The *Dentalium incurvum*, Renier, f. 39 a, b, of the same plate, looks like a rubbed *Cæcum*; but neither figure nor description is sufficiently accurate for identification.

largest species of the *Anellum* group, known by its very faintly expressed ribs, plug intermediate between the mucronate and unguulate forms, and mouth not thickened, but with a slight contraction and expansion like that of a preserve jar. The reticulating striulæ in the interspaces are only seen in very fresh specimens. The shell is then glossy, and to a slight extent transmits the light. The operculum in well-preserved specimens is almost flat; but the drying of the animal sometimes draws it into a concave form. The ten outer volutions are conspicuously marked by a spiral rib. The shell in its young state is quite smooth, and by no means accords with Mr. Clark's surmise, that ?*Skenea rota* may be the nuclear portion. At this period it is known at once from *C. glabrum* by the sharply angular plug. Whether the *Cornuoides major* and *minor* of Brown are the young of the same species, or one of *C. trachea* and the other of *C. glabrum*, cannot easily be ascertained, except from the comparative size.

15 b. CÆCUM (?TRACHEA, var.) OBSOLETUM.

C. (Anellum) t. "C. trachæ" *simili; sed multo minore, gracili; postice annulis distantibus, antice sublævi; tota superficie minutissime longitudinaliter corrugata; septo subungulato, margine laterali concavo.*

Long. .095, lat. .015—.02.

Hab. Salamis (Bean). 1 sp. Mus.

This solitary shell may be a starved form of the common species; but as it may belong to an Ægean type not yet investigated, it is kept provisionally separate.

16. CÆCUM GURGULIO, ? n. s.

C. (Anellum) t. parva, solida; annulis xxx.-xxxv. rotundatis, subexpressis cincta; interstitiis minimis; septo mucronato, mucrone parvo, subdextrorsum sito, margine laterali recto: operculo?

Long. .077, lat. .017—.02.

Hab. W. Indies, sponge of commerce. Mus. Brit. &c.

?= *Odontidium rugulosum* (pars), Phil. loc. cit.

The West Indian specimens quoted by Philippi probably belong to this form, which may possibly prove to be a dwarf variety of *C. trachea*. Seven specimens were found, one only of which was perfectly fresh. This displays no sign of the longitudinal corrugation characteristic of *C. trachea*: moreover the plug is decidedly mucronate, though very short; and the rings are both fewer and larger than in the European species.

17. CÆCUM TUMIDUM, n. s.

C. (Anellum) t. tereti, sublævi seu annulis obsoletis ornata; apertura haud contracta, annulo tumido cincta; septo mamil-

lato, plus minusve tumente; margine laterali convexo, dorsum versus subangulato: operculum?—.

Long. .11, lat. .018—.024.

Hab. Sutton, Cor. Crag. Mus. Brit. &c.

= *C. trachea*, Searles Wood, Crag. Moll. p. 115. pl. 20. f. 5 (? pars), non Mont. et auct.

It is with great hesitation that I venture to differ from so accurate an authority as the author of the 'Crag Mollusca:' nevertheless, having subjected all the specimens in the British Museum, as well as some sent me by Mr. Wood, to a very rigid examination under the microscope, I have not been able to find a single specimen that can be strictly affiliated to *C. trachea*. Of the minute sculpture in a crag shell, little can be said; the majority of specimens are almost smooth. The recent species is, however, peculiar in the character of the aperture, never showing even an approach to the swelling mouth of the fossil; and the plug of the latter is completely mamillated, though with a flattening and incipient apex at the dorsal side. When compared with the swollen variety of the recent shell, the front of the latter displays an irregularity of outline which contrasts strongly with the beautifully rounded fossil, and proves it to be of abnormal growth. The B.M. specimens being somewhat mixed on the tablets, it is probable that the magnified plug in the figure of this species is really an individual of *C. mamillatum*, with the mucro rubbed off.

18. *CÆCUM FIRMATUM*, C. B. Ad. (diagn. auct.)

C. (Anellum) t. robusta, satis tereti; t. jun. primum lævi, dein annulis circ. xxiii.—xxxiii., primum acutioribus, dein parum quadratis; interstitiis subquadratis, interdum evanidis; septo subungulato; apice parum prominente, subdextrorsum sito, obtusiore; margine laterali subrecto: operculo vix concavo, suturis minus definitis.

Test. jun. long. .067, lat. .006—.012.

Test. adol. long. .063, lat. .013—.017.

Test. adult. .1, lat. .016—.025.

Hab. Panama, common (*C. B. Adams*); Mazatlan, rare, off *Spondylus* and among *Olivellæ*. Mus. Brit.

Pars = *Cæcum firmatum*, C. B. Ad. Pan. Shells, no. 213, pp. 161, 311.

+ *C. eburneum*, C. B. Ad. no. 212. pp. 161, 311.

+ (adolesc.) *C. monstruosum*, C. B. Ad. no. 216. pp. 162, 311.

+ (adolesc.) *C. pygmæum*, C. B. Ad. no. 218. pp. 163, 311.

+ (jun.) *C. diminutum*, C. B. Ad. no. 211. pp. 161, 310.

Maz. Cat. p. 320.

Known from *C. trachea* by the stout subquadrated rings. If the mode of specific diagnosis adopted by Prof. Adams had been followed in this monograph, the number of species (wherever the specimens were sufficiently abundant) would have had to be increased fivefold.

19. CÆCUM QUADRATUM, Cpr.

C. (Anellum) t. parva, curta, solida, annulis quadratis xii.—xx. cincta, interstitiis profundis, quadratis; apertura subcontracta, annulis concurrentibus; septo mucronato; mucrone parvo, exstante, angusto, subdextrorsum sito; margine laterali concavo: operculo valde concavo, anfr. circ. x., linea spirali expressa.

? Var. compactum. *T. interstitiis parvis seu evanidis, annulis maxime planatis.*

Long. .072, lat. (interst.) .016, (annulis) .02.

Hab. Mazatlan, rare. Mus. Brit. &c.

Maz. Cat. p. 322.

The extreme forms are very different; but no uniform character has been observed by which they can be separated.

20. CÆCUM CLATHRATUM, Cpr.

C. (Anellum) t. haud parva, solidiore, annulis valde distantibus, acutioribus, extantibus cincta; interstitiis concavis; septo subplanato, mucronato; mucrone minimo, obtuso, pæne in dorsum sito; margine laterali in adulto haud conspicuo, planato: operculo? . . .

Test. jun. long. .057, lat. .007—.017.

Test. adult. long. .102, lat. (interst.) .026, (annul.) .03.

Hab. Mazatlan, very rare. Mus. Brit. &c.

Maz. Cat. p. 322.

An extremely beautiful species, remarkable for its size, nearly flat plug, and distant rings with curved interspaces.

21. CÆCUM FLORIDANUM, Stimps.

C. (Anellum) "t. valde arcuata, solida, alba, nitida; annulis circa xxxii. acutis, elevatis cincta, interstitiis multo latioribus; apertura parum obliqua, haud contracta; interdum annulo lato aperturam superante;" septo? . . . : operculo?

Long. .075, lat. .02, poll.

Hab. Florida.

Stimpson in Proc. Bost. Soc. Nat. Hist., Oct. 15th, 1851.

22. CÆCUM REGULARE, n. s.

C. (Anellum) t. satis tereti, tenuiore, alba, subdiaphana; annulis subacutis, regularibus xx.—xxiv. cincta, interstitiis conspicuis; apertura declivi, contracta, haud incrassata; septo mucronato, mucrone parvo, haud conspicuo, subdextrorsum sito; margine laterali parum elevato, subconvexo: operculo?

Test. jun. long. .04, lat. .007—.014.

Test. adult. long. .085, lat. .018—.024.

Hab. W. Indies (*Woodward*); Singapore, 2 spec. from *Lithophagus* burrow in *Plicatula*; Australia, 1 young sp. in *Petalocochus nerinaeoides*. Mus. Brit. &c.

Twelve specimens of this species have been examined from the W.

Indies, and three from the Eastern Seas, as well as one pseudo-British specimen from Mr. Alder's cabinet*. They are all very constant and regular in the arrangement of the rings, never presenting so many as are recorded for *C. Floridanum*, and further differing in the contraction of the mouth. More exact information about the Florida species may, however, prove them identical.

23. *CÆCUM GRACILE*, n. s.

C. (Anellum) t. valde tereti, parva, annulis circiter xxiv. subdistantibus, subacutis ornata; apertura haud contracta, haud declivi, annulo valido cincta; septo?, margine laterali subplano: operculo? . . .

Long. .09, lat. .012—.017.

Hab. Japan (*Stimpson*). Mus. Smithsonian.

Dr. Gould, to whom is entrusted the duty of describing the shells of the U.S. Japanese Exploring Expedition, has kindly allowed me to include the *Cæca* brought back by Mr. Stimpson in the present Monograph. They consist of but two specimens. One is a young shell, with the plug broken off, closely resembling *C. elongatum*, var. *semilæve*, from Mazatlan. The other is the shell here described, which, though dead and worn at the plug, is adult, and clearly distinct from any other recorded species. It is much more slender even than *C. elegantissimum*, with the rings closer and not so sharp.

24. *CÆCUM ELEGANTISSIMUM*, Cpr.

C. (Anellum) t. diaphana, vitrea, nitida, alba, arcuata, tereti, subelongata; apertura parum declivi, parum contracta; t. jun. lævi; t. adolescente et adulta liris concentricis distantibus (xiv.—xviii.) acutis cincta; interstitiis elongatis, elegantissime arcuatis; septo submucronato, subungulato; apice obtuso, parvo, haud valde prominente; margine laterali concavo: operculo? . . .

Test. jun. long. .042, lat. .006—.013.

Test. adult. long. .1, lat. .014—.023.

Hab. Teneriffe, in gravel sand, 50 fms. (*R. M'Andrew*). Mus. Brit. &c.

= *Cæcum trachea*, M'Andr. Geogr. Distr. Test., Liverpool, 1854; B.M. List Canary Shells, p. 29 (non Mont. et auct.).

C. elegantissimum, Cpr. in M'Andr. Rep. Moll. N. E. Atl., Brit. Assoc. 1856, p. 149.

More than 300 specimens of this exquisitely beautiful species were dredged by R. M'Andrew, Esq., in company with *C. vitreum* and *C. pollicare*. It differs from *C. undatum* in its glossy texture, slender form, and very distant rings: also in the plug, which is intermediate between the mucronate and unguulate forms. The young shell is quite smooth; and as soon as the rings commence, they are distant as in the adult.

* See Note in Brit. Moll. vol. iii. p. 180. The other specimen on the same card was *Meioceras cornucopiæ*, also from the W. Indies.

24 b. *CÆCUM* (? *ELEGANTISSIMUM*, var.) *SEARLES-WOODII*.

C. (Anellum) t. parva, gracillima, elongata, alba, subdiaphana, subvitrea; annulis subobsoletis, creberrimis, subacutis cincta, seu interdum sublævi; septo unguato, apice subdextrorsum sito; margine laterali subrecto: operculo?...

Test. adol. long. .046, lat. .007—.012.

Test. adult. long. .068, lat. .008—.013.

Hab. Teneriffe, in gravel sand, 50 fms., very rare (*R. M'Andrew*).
Mus. Brit. &c.

= *Cæcum Searles-Woodii*, Cpr. in M'Andr. Rep. Moll. N. E. Atl., Br. Ass. 1856, p. 149.

Twenty-three specimens were found differing from *C. elegantissimum* as above stated. It is annulated from a very early stage; the rings are closer (about twenty-four in the young shell), scarcely sharp, and often obsolete; the growth is scarcely tapering and very slender; and the plug is unguate, turned somewhat to the right. Whether it prove to be a dwarfed condition of *C. elegantissimum*, or a distinct species, it is named in remembrance of the author of the invaluable Monograph of the Crag Mollusca, where the plugs of *Cæca* were first described.

25. *CÆCUM* *UNDATUM*, ? n. s.

C. (Anellum) t. obesa, curta; t. jun. lævi; t. adulta annulis x.-xv. acutis cincta; interstitiis concavis, undatis; antice et postice contracta, planis decollationis et aperturæ ad ang. circ. 115°; apertura contracta, dein paululum reflexa, acuta; septo unguato; apice acuto, elongato, prominente; margine laterali recto: operculo concavo, anfr. circ. xv., sutura distincta.

Variat *t. minus obesa, annulis subobsoletis.*

Test. jun. long. .042, lat. .01.

Test. adol. long. .067, lat. .01—.02.

Test. adult. long. .074, lat. .021.

Hab. Mazatlan, abundant in worm-eaten shells of *Spondylus cal-cifer*, &c. (? Panama, 1 sp., *C. B. Ad.*). Mus. Brit. &c.

Maz. Cat. p. 323; Brit. Ass. Rep. 1856, pl. 9. f. 4 a-o.

Test. adol. ? = *C. parvum*, *C. B. Ad. Pan. Shells*, pp. 163, 311: "t. arcuata, gracili, vix tereti; albida; annulis xv. acutis, distantibus, haud multum elevatis; apice laterali, prominente. Long. .065, lat. .019." Sp. un. Mus. Amherst.

At least 500 specimens have been examined of this species, in almost every stage of growth; both young and adults, to the number of about fifty, containing their opercula. By this means the mode and variation in growth were ascertained, and the knowledge gained applied to the other species where connecting links were not accessible. The "monstrosum" stage, in which the tube hitherto smooth and slender suddenly alters its angle of growth and diameter, assuming sharp rings, is very remarkable. The *posterior* contrac-

tion of the tube in the adult shell of this and some other species is also well worth attention.

Sect. C. FARTULUM.

Cæca lævia: *t. sæpius utrinque contracta, apertura declivi.*

In form and texture, some of the species approach the adult state of *Meioceras*: others pass into the more typical groups. They are named from their likeness in shape to a little sausage.

26. CÆCUM LÆVE, C. B. Ad. (diagn. auct.).

C. (Fartulum) t. juniore "C. undatum" *fere exacte simulant, paulum graciliore*; *t. adulta eidem simili, sed lævi, nitida, subdiaphana, brunneo tincta*; *antice et postice minus contracta; aperturam versus interdum tumente; operculo concavo, suturis minus distinctis.*

Test. jun. long. .035, lat. .005—.01.

Test. adult. long. .07, lat. .018.

Hab. Panama, 2 sp. (C. B. Ad.); Mazatlan, not uncommon. Mus. Brit.

C. B. Ad. Pan. Shells, pp. 162, 311; Maz. Cat. p. 325.

So like is this shell, even in many minute particulars, to *C. undatum*, that a single specimen might have been taken for an extreme variety of it. A careful examination of at least 200 specimens, however, clearly proves their distinctness.

27. CÆCUM BIMARGINATUM, n. s.

C. (Fartulum) t. "C. læve" fere exacte simulant; planis truncationis ad angulum 100°; septo unguato, apice minus elevato, subdextrorsum sito; margine laterali recto seu paulum convexo: operculo multispirali, subplanato, bimarginato.

Long. .078, lat. .015—.022.

Hab. Singapore, nestling in *Lithophagus* burrow in *Plicatula*; Australia, nestling in *Petalconchus nerinæoides*. Mus. Brit.

The fortunate discovery of a specimen with the operculum *in situ*, presenting a double rim round the edge, as in some of the *Cyclostomidae*, furnished a satisfactory character to distinguish the E. Indian from the very similar Mazatlan species. The attempt to extract it was, however, unsuccessful; and the original specimen from *Plicatula* perished after the description had been written. Five others from the neighbouring seas, but without opercula, are provisionally allotted to the same species. (See however note * to sp. 41, *infra*.)

Two young specimens of uncertain locality (from shell-washings), but probably from the E. Indies, are doubtfully referred to this species on account of the similarity in the plug (Br. Mus.).

28. CÆCUM FARCIMEN, Cpr.

C. (Fartulum) t. "C. lævi" simili, sed albida, apertura minus

contracta ; annulis rotundatis paucis, subobsoletis, aperturam plerumque præcedentibus ; septo submucronato ; apice subprominente, haud acuto ; margine laterali subtumido : operculo concavo, suturis distinctis, peripheriam versus linea elevata instructis.

Long. .064, lat. .019.

Hab. Mazatlan, very rare in *Spondylus*; and living among *Olivellæ*. Mus. Brit.

Maz. Cat. p. 326.

This species differs from *C. lære* not only in the more slender shape and submucronate plug, but also in the spiral rib round the outer whorls of the operculum, which was found in four specimens.

29. CÆCUM VITREUM, Cpr.

C. (Fartulum) t. subelongata, vitrea, nitida ; apertura parum declivi, viz contracta et postea reflexa ; aperturam versus tumidiore ; septo prominente, mucronato ; margine laterali recto seu subconcavo ; mucrone plus minusve obtuso, subdextrorsum sito : operculo? . . .

Test. jun. long. .038, lat. .007—011.

Test. adol. long. .073, lat. .01—018.

Test. adult. long. .107, lat. .017—023.

Hab. Teneriffe, 50 fms. gravel (*M'Andrew*). Mus. Brit. &c.

Cæcum glabrum, M'Andr. Geogr. Distr. Test. 1854 ; B.M. Cat. Shells Canar. p. 29 (non Mont.).

Cæcum vitreum, Cpr. in M'Andr. Rep. Moll. N.E. Atl., Br. Ass. 1856.

More than 100 specimens were found of this species, which is characterized by its somewhat tapering shape, and obtusely mucronated plug. The surface sometimes displays annular lines of growth.

29 b. CÆCUM (? VITREUM, var.) CLARKII.

C. (Fartulum) t. "C. vitreo" simili, sed minore, magis tereti ; septo unguato ; apice obtusiore : operculo? . . .

Variat margine laterali valde convexo, tumente.

Test. jun. long. .042, lat. .008—013.

Test. adult. long. .082, lat. .013—015.

This is probably a distinct species from *C. vitreum*; but as the plugs in each form are more variable than usual, the species is not constituted till more is known. About fifty specimens were found. It is named after the first discoverer of the animal in this interesting genus.

Hab. Teneriffe, 50 fms. gravel (*M'Andrew*). Mus. Brit. &c.

30. CÆCUM POLLICARE, n. s.

C. (Fartulum) t. "C. vitreo" simili, sed plerumque magis tereti ; nitida, sed striulis minimis tota superficie longitudinaliter cor-

rugata; septo unguato, margine laterali recto, apice obtusiore: operculo?...

Test. jun. long. .055, lat. .006—.012.

Test. adult. long. .1, lat. .015—.023.

Hab. Teneriffe, 50 fms. gravel (*M' Andrew*). Mus. Brit. &c.

On examining the smooth Teneriffe *Cæca* under a $\frac{1}{4}$ -inch achromatic, thirty-six specimens were found, in shape agreeing with *C. Clarkii*, but with the whole surface covered with irregular longitudinal corrugations resembling thumb-marks, a sculpture entirely wanting in the rest of the specimens. In the very young shells it is scarcely discernible.

31. ?*CÆCUM CORRUGULATUM*, Cpr.

?*C. (Fartulum) t.* “? *Brochinæ glabriformi*” *simili, sed tumidiore; superficie transversim tenuissime striata, striulis minimis irregulariter corrugata; septo? mamillato: operculo?...*

Long. .075, lat. .017—.022.

Hab. Mazatlan, 1 sp., off *Chama*. Mus. Brit.

Maz. Cat. p. 327.

The only specimen found is dead and imperfect, but presents a sculpture like that of *C. pollicare*, yet in the opposite direction. It may be a *Brochina*.

32. *CÆCUM DEXTROVERSUM*, Cpr.

C. (Fartulum) t. tereti, satis elongata, tenui; septo tumido, submamillato; mucrone tumidissimo, dextrorsum versato; margine laterali valde convexo: operculo concavo, suturis vix definitis.

Test. jun. long. .023, lat. .008.

Test. adult. long. .092, lat. .024.

Hab. Mazatlan, rare. Mus. Brit. &c.

Maz. Cat. p. 328.

About thirty specimens were found, off *Spondylus*, and (living) among *Olivellæ*, of which six had their opercula. The knob on the plug is frequently worn off in the adult, leaving a mamillate appearance.

32 b. *CÆCUM* (? *DEXTROVERSUM*, var.) *ANTILLARUM*.

One young specimen only was found in the W. Indian sponge, not presenting any characters by which it can be separated from *C. dextroversum*. Additional materials, however, may prove them distinct; and it is kept provisionally separate. It measures long. .056, lat. .01—.012.

33. ?*CÆCUM SUBQUADRATUM*, n. s.

?*C. (Fartulum) t. elongata, minima, lævi, haud nitente; apertura haud contracta; septo submamillato, subungulato; margine laterali extante, supra satis convexo, lateribus rectis, par-*

allelis; apice obtusissimo, lato, ad latus quadrato: operculo? . . .

Long. .068, lat. .009—.012.

Hab. Port Elizabeth (*Bean*). Mus. Brit.

Three specimens were found, differing from all other known species in the shape of the plug. This, on a side view, has parallel sides with a somewhat rounded top; the apex, however, is at the end of one of the straight sides. The shell resembles *B. glabra* in the non-contraction of the aperture. The texture is in some parts slightly diaphanous, but opaque behind the mouth. It may be a *Brochina*.

34. CÆCUM REVERSUM, Cpr.

C. (Fartulum) t. jun. "C. dextroverso" simili, sed septo subconvexo; mucrone reverso, semicylindraceo, arcuato, aperturam versus convexo, dorsum versus concavo; t. adulta? . . . : operculo? . . .

Long. .048, lat. .012.

Hab. Mazatlan, 1 young sp. off *Spondylus*. Mus. Brit.

Maz. Cat. p. 329.

The plug is unique; the mucro resembles a small *Cæcum* lying on the slightly swollen surface, with its horns towards the back, and its back adjoining the front of the shell.

35. CÆCUM TERES, Cpr.

C. (Fartulum) t. elongata, tereti, longitudinaliter interdum subangulata; septo mucronato; mucrone subelongato, obtuso; margine laterali subrecto: operculo vix concavo.

Test. jun. long. .045, lat. .012.

Test. adult. long. .115, lat. .017—.027.

Hab. Mazatlan, very rare. Mus. Brit. &c.

This shell has the shape of *Elephantulum* without the ribs, a tendency to which, however, sometimes appears in slightly-marked angles.

36. CÆCUM MAMILLATUM, S. Wood.

C. (Fartulum) t. tereti, solida; apertura haud declivi, tumente; septo mucronato, mucrone dactyliformi; margine laterali valde concavo.

Variat *mucrone parvo, subtumente.*

Long. .15, lat. .023—.033.

Hab. Sutton, Cor. Crag, abundant. Mus. Brit. &c.

C. mammillum, S. Wood, Cat. 1842.

C. mammillatum, S. Wood, Crag. Moll. p. 116, pl. 20. f. 4 a, c; ? + f. 5 a (rubbed).

Adol. = *Cæcum m. var. subulatum*, S. Wood, loc. cit. f. 4 b.

Jun. = *Cæcum (?) incurvatum (?)*, S. Wood, loc. cit. p. 117, f. 7 a, b; (non *Serpula incurvata*, Walker).

This species is known from the smooth forms of *C. tumidum* by the greater proportionate length, less thickening of the mouth, and the very conspicuous mucro on the otherwise flattened plug. As Crag shells are prone to variation, it is probably not a mark of specific difference that the mucro varies in shape, being sometimes straight, sometimes bent as in the figure, sometimes long, sometimes short, sometimes swollen so as to approach *C. trachea*. It is probably one of these specimens that is figured at 5 a.*

Genus BROCHINA, Gray.

Testa Cæco similis, lævis; apertura simplici, acuta; septo mamillato. Operculum convexum; anfractibus linea elevata instructis.

It will be a remarkable coincidence, should it hereafter appear that all the shells with mamillated plug and sharp mouth have the convex operculum. At present we can only distinguish *Brochina* from *Cæcum* by the latter character. As the same terraced structure appears in the concave forms, as some of these are almost flat, and as the amount of convexity differs in different individuals, or in the same individual according to accidents in drying, this alone forms a scarcely sufficient generic character.

Brochina, Gray, Guide Moll. p. 101.—*Cæcum*, pars, auct.

37. BROCHINA GLABRA, Mont. (diagn. auct.)

Br. t. parva, tereti, lævi, tenui, subdiaphana; apertura haud contracta, haud declivi, haud tumida; septo mamillato, plus minusve elevato, apice nullo; margine laterali circulari; marginibus decollatis, haud conspicuis. Test. jun. planorbiformi, anfr. ii. et dimidio, tumidis, tenuissimis. Operculo pellucido, corneo, extante; plerumque medio planato, homogæneo; dein conico, lateribus plus minusve divergentibus, linea spirali extante, anfr. v.-vii.; interdum omnino convexo, linea spirali apicem versus ascendente.

Test. jun. spir. diam. .011.

Test. jun. elongata, long. .03, lat. .006.

Test. adolesc. long. .055, lat. .008—.012.

Test. adult. long. .068, lat. .012—.015.

Hab. British Seas (vide *Forbes & Hanley*); Mediterranean (*M'Andrew*); Piedmont (*Jeffreys*); Cephalonia (*Bean*); fossil in Cor. Crag (*S. Wood*).

? = *Dentalium minutum*, Linn. ed. xii. p. 1264; Dillw. Rec. Shells, vol. ii. p. 1068 (vide antea, p. 1).

Dentalium glabrum, Mont. Test. Br. vol. ii. p. 497 (1803); Maton

* Students have cause to regret that the invaluable series of Crag Mollusca from which the monograph was compiled were not named by the author before he so generously presented them to the British Museum. In the absence of a copy of the work in the Zoological Department, they are still unnamed, and the identification of types is retarded.

& Rack. Trans. Linn. Soc. vol. viii. p. 239; Turt. Conch. Dict. p. 40; Br. Mar. Conch. p. 4. f. 5; Wood, Ind. Test. Ed. Hanl. p. 192. no. 14. f. 12.

Cæcum glabrum, Flem. Enc. Edinb. pl. 204. f. 7, pl. 205. f. 8, 9; Forbes & Hanl. Br. Moll. vol. iii. p. 181. pl. 69. f. 5; H. & A. Ad. Gen. vol. i. p. 356; Clark, Test. Mar. Br. p. 329; Searles Wood, Crag Moll. p. 117. pl. 20. f. 6; M'Andr. Br. Ass. Rep. Moll. N.E. Atl. 1856, p. 149; Jeffr. Mar. Test. Piedm. p. 30. [Non M'Andr. Geogr. Distr. 1854; B.M. Cat. Shells Canar. p. 29.]

Brochina glabra, Gray, Syst. Distr. Moll. p. 101.

Orthocera glabra, Flem. Br. An. p. 237.

Odontidium levissimum, Cantr. Bull. Brux. vol. ix. p. 2, 1842.

Brochus glaber, Brown, Ill. Conch. Gr. Br. p. 125. no. 5. pl. 56. f. 3.

? + *Brochus lævis*, Brown, loc. cit. no. 6. f. 6*.

T. adol. = *Brochus arcuatus*, Brown, Ill. Conch. Gr. Br. p. 125, no. 7. pl. 56. f. 9; Forbes & Hanl. Br. Moll. vol. iii. p. 182.

T. jun. = ? *Serpula incurvata*, Walk. Test. Min. f. 11, 1787; Ad. Micr. pl. 14. f. 7; Maton & Rack. Trans. Linn. Soc. vol. viii. p. 246; Turt. Conch. Dict. p. 156; Dillw. Rec. Sh. vol. ii. p. 1071; Wood, Ind. Test. ed. Hanl. p. 192. no. 3. pl. 38. f. 3 m.

Vermiculum incurvatum, Mont. Test. Br. p. 518.

? = *Cornuoides minor*, Brown, Ill. Conch. Gr. Br. p. 125. no. 2. pl. 56. f. 50: " = *Serpula recta*, Walker, Flem."

[? Non ? *Cæcum ? incurvatum*, S. Wood, Crag Moll. p. 117. pl. 20. f. 7 a, b, = ? *Serpula recta*, S. Wood, Cat. 1842: ? = *Cæcum mamillatum*, jun.]

The shell is described as snow-white by Hanley. This is true of dead specimens; but when fresh it is somewhat horny in texture, and so pellucid, that the shape of the operculum within can easily be seen through the shell by transmitted light. The English specimens generally have the plug somewhat flattened, presenting not more than a third of a sphere; but many of the Mediterranean shells, especially when young, are so inflated as closely to resemble the *Matzatian* species.

I have carefully examined about thirty specimens with the opercula *in situ*, of which part were dredged by Mr. M'Andrew in the Mediterranean, part were most kindly placed at my disposal by Mr. Clark. From several of these, after softening the animal in dilute potash (till the viscera were clearly discernible through the transparent shell), I removed the opercula, and subjected them to a rigid scrutiny, by transmitted and reflected lights, under various achromatic powers up to $\frac{1}{4}$ in. I am not able to confirm all the observations recorded by Mr. Clark, and presume that some of them may

* This may be a foreign species, as the aperture is said to be somewhat contracted; but as the protuberance is further said to be central, it is probably, as Hanley supposes, a form of *B. glabra*. "*D. imperforatum*, Walker, Mont.," is cited as a synonym: perhaps the author may have been misled by the figure in Wood (no. 12), which corresponds with *D. imperforatum*, but is clearly intended to represent *D. glabrum*.

have been made from imperfect specimens. I have searched in vain for the Silicularoid windlass and fringe and the Polystomelloid loculi. The ordinary shape is like that of a common brown basin—flat in the middle, where the spiral elements are very rarely discernible, with the sides flattened, diverging at a greater or less angle, and with a strong rib bounding the medial portion, and proceeding in about seven spiral turns (or less) to the periphery. Although presenting analogies with the opercula of some of the *Bivoniae*, it appears much more nearly related to the *Turritellidae*, from which it differs in being bent outwards instead of inwards. The peculiar characters are not so constant as might be expected, and perhaps depend in part on the amount of contraction of the animal in drying. One specimen was found with but very slight excuvation: a few were pretty regularly convex, instead of being trigonal; and in these the central area was not marked off by the rib, which proceeded to lose itself gradually towards the apex. The flattened part is about the size of the first tube of the shell; the whole diameter, about .012. The spiral rib is also found, more or less developed, in species with a concave operculum.

The *Brochus arcuatus* of Brown proves to be a veritable *Brochina glabra* in a transition state. After I had described and returned Mr. Alder's apparently plugless specimen, it came in two in his hands, displaying a duly formed plug in the middle. The decollated portion, which was abnormally persistent, having been open, seems to favour the hypothesis I had ventured to suggest from the complex character of the plugs in *Cæcidæ*, that they are not mere septa continually cast off and renewed, but an integral part of the structure, removed from time to time with additional layers. Some eminent naturalists, however, state that this is impossible.

37 b. ? BROCHINA ? GLABRA.

Hab. W. Indies, in sponge of commerce.

Very few W. Indian specimens were found of this form; and of these only three were sufficiently perfect to allow of identification. These did not present any characters by which they could be distinguished from the European species; but they await a knowledge of the operculum.

38. ? BROCHINA GLABRIFORMIS, Cpr.

? *B. t.* " *B. glabræ* " *simillima, sed septo mamillato tumentiore, fere hemisphærico : operculo ? . . .*

Long. .073, lat. .017.

Hab. Mazatlan, extremely rare. Mus. Brit. &c.

Maz. Cat. p. 327.

This species is kept provisionally separate, at least till the operculum has been examined. The shell alone affords no satisfactory mark of specific separation.

Genus MEIOCERAS*.

Testa adolescens solute spiralis, haud planata; adulta sæpe inflata. Apertura obliqua. Operculum spirale, extus concavum; anfractibus linea spirali instructis.

Cæcum, pars, Stimpson. (Pars = *Inflatulum*, B. M. Maz. Cat. p. 314, note *.)

The young shells of this group might easily be passed over as *Vermetidæ*; when perfect, however, the minute plug displays their Cæcous origin, while their peculiar growth, in a loose spiral instead of a plane, seems to warrant their separation. The young and adult shells have been found together (1) fossilized in the coral rocks of Barbadoes†, (2) in recent shell sand from the W. Indies, and (3) in the coarse sponge of commerce. The peculiarities of the adult form are easily explicable from its spiral origin. If the decollated parts had remained, *Meioceras* would bear a loose resemblance to *Helicoceras*, and *Cæcum* to *Toxoceras*. It is presumed that these creatures are more stationary in their habits than *Cæca*; their mode of growth would enable them to keep pace with sponge, but would be inconvenient in crawling through the narrow passages in which *Cæca* have been found. All the species found are glossy, without sculpture, and with a texture often partly opaque, partly transparent, in irregular concentric bands interrupted by longitudinal ribs, like the framework of inflated fashionable dress. The adult shells can scarcely be distinguished from *Fartula*, the irregularity of outline being the best criterion.

39. MEIOCERAS NITIDUM, Bean, MS.

M. t. nitidissima, vitrea seu subcornea, subdiaphana; fusca, seu albida et candida nebulosa; adolescente anfractibus paucis, rapide augmentibus; t. adulta valde gibbosa, plerumque maxime inflata, utraque extremitate constricta; apertura valde declivi, circiter angulum 130° planum apicis respiciente; margine antico maxime arcuato, postico subplanato: septo submucronato, conico, marginibus laterali et dorsali rectis, apice parum elevato, acutiore, dorsali: operculo parum concavo, linea spirali extante instructo; anfractibus paucis, circiter v.

Variat t. magis elongata, minus inflata.

* *μείον*, rather small; *κέρας*, horn.

† Not from Grignon, as erroneously stated in the note, p. 314 of the 'Mazatlan Catalogue.' Those who possess the work are requested to cancel the note altogether. The very faulty name *Inflatulum* was simply intended as a section under *Cæcum*, founded on the shape only. As the peculiar shape is found to vary even in the species, and as the true generic character is in the *Cornucopiae*-shaped growth of the adolescent shell, I gladly adopt the excellent name given at my request by Mr. H. Adams. The finding of the fossil specimens was due to the skilful labour of the late Mary Clow, the faithful attendant of S. Worsley, Esq., long known as (though blind) the zealous investigator of the Inferior Oolite fossils of Dundry. It was to serve as eyes to guide his knowledge, that I commenced the study of shells.

? = *Cæcum nitidum*, Stimps. Monogr. Cæc. U.S. in Proc. Bost. N. H. S. Oct. 15th, 1851, p. 112*.

While size and shape are tolerably good guides in examining adult *Cæca*, they afford very little character in *Meiocerata*. As the adult shell might be formed either out of a bend in the spire or a straightened prolongation, it might assume the peculiar form of the species, or a thinner, longer condition. The spiral formation also gives more or less of twist to the axis even of the adult shell, which causes specimens to roll over at a touch, and makes the examination even of the profile of the plug a matter of difficulty. The same cause may also make the shape of the plug itself not quite so constant as usual. More than 150 specimens have been examined, of which three possessed their opercula.

Test. adolesc. long. .058, lat. .006—.02.

Test. adult. normal. long. .088, lat. .013—.027.

Test. adult. elong. long. .091, lat. .014—.027.

Test. adult. obes. long. .068, lat. .015—.03.

Hab. W. Indies, in shell sand, and sponge of commerce; fossil in coral rock, Barbadoes (*Dr. Cutting*); ? Florida (*Stimpson*). Mus. Brit. &c.

40. *MEIOCERAS CORNUCOPIÆ*, n. s.

M. t. "*M. nitidum*" *simulante; sed minore, minus inflata; t. adollescente anfractibus minus rapide augentibus; septo mucronato, mucrone acutissimo, haud elongato, a superficie subplanato subito ascendente; margine laterali valde incurvato: operculo? . . .*

Variat *mucrone elevato*.

Test. jun. long. .048, lat. .007—.015.

Test. adult. elong. long. .09, lat. .012—.02.

Test. adult. compacta long. .064, lat. .013—.018.

About 120 specimens were found, of which one apparently possessed a thin, scarcely concave operculum. A high power, however, displayed a texture without trace of spiral elements; and it was probably formed of adventitious matter. Some forms of this species run into aberrant forms of the last: but it may in general be easily distinguished, in the young shell by the more gradual increase; in the adult by the small size and slight inflation; and in all stages by the very sharp mucro, with concave sides.

Hab. W. Indies, in sponge of commerce.

41. *MEIOCERAS CORNUBOVIS*, n. s.

M. t. "*M. cornucopiam*" *simulante; sed septo subungulato; apice angusto, submucronato; margine laterali plus minusve convexo, sæpe inflato: operculo satis concavo; extus lamina*

* Mr. Stimpson's diagnosis does not speak of the plug, and might accord with any of the three species here proposed. It will save much confusion between this and Mr. Bean's MS. name, should the two (on comparison of specimens) prove to be identical.

extante spirali fortiori, anfr. circiter xii. definiente, nucleum versus obsoleta; intus umbone satis prominente, superficie striulis minimis concentricis ornata.

Variat apice parum seu valde elevato.

Test. adult. gibbosa, long. .063, lat. .013—.022; div. sept. et apert. 130°.

Test. adult. normalis, long. .067, lat. .013—.02; div. sept. et apert. 105°.

Test. adult. elongata, long. .082, lat. .016—.022; div. sept. et apert. 105°.

About 240 specimens have been examined, of which three possessed their opercula. In one, the spiral raised bar is distinctly traceable to the very apex; in another it is only seen for about eight whorls. The same difference is recorded under *Brochina glabra**. The shells go through the same changes of form as in the last species; and many specimens display the same "crinoline" pattern in the transparent and opaque banding. It is in general easily distinguished by the shape of the plug, which, even when the apex is but slightly raised, is still somewhat tumid, while in *M. cornucopiæ* the lateral outline is concave. Aberrant specimens exist in all the species which cannot be discriminated with confidence. It is possible that the forms with the high pointed plug belong to a fourth species, perhaps a *Fartulum*, allied to *C. teres*; but they have here been distributed among the rest according to the balance of characters.

GENUS STREBLOCERAS†.

Testa haud decollata; vertice nucleoso orbiculari, planæ tuberculari perpendiculariter affixo. Habitus incrementis plerumque orbicularis, seu subtortuosus.

This earliest known Cæcid preserves in its adult state the first stage of *Cæcum*,—the whorls not being decollated, nor any plug formed. The shells are too large and too numerous to be supposed rudimentary, especially when the extreme rarity of the "Cornuoides" form even in recent *Cæca* is taken into consideration. It bears the same relation to *Cæcum* that *Rimula* does to *Glyphis*‡, and, as far as the shell is concerned, forms an easy passage to *Vermetus*. The plane of growth is generally flat, as in *Cæcum*; but some specimens have a slight twist, forming an approach to *Meioceras*. In

* Having succeeded in extracting one of the opercula, .018 in diameter (in which the concavity was about .002, the inner boss about .001), I was surprised to find, on the second day's examination, that it presented fewer whorls, and those further apart, than before. On investigation, it appeared that the whole margin had bent over inwards, giving the object the appearance of an elf's "wide-awake" hat. The tiny article was then caused to balance on its reflected margin, in which position the strong ribs presented much the appearance of the lost operculum described under *Cæcum bimarginatum*.

† σρεβλός, twisted; κέρας, horn.

‡ B.M. Maz. Cat. pp. 213, 220 = *Lucapina*, pars, H. & A. Ad., non Gray, = *Capitana*, Gray, Guide Moll. 1857, p. 166. The proof sheets of the Maz. Cat., bearing date May 1856, were submitted to Dr. Gray's inspection.

the nuclear whorls it is set perpendicularly to the plane of the adult, in this respect also differing from *Cornuoides* of Brown. As his genus must be expunged, being constituted only for young *Cæca*, the name is retained for the typical species.

42. *STREBLOCERAS CORNUOIDES* (Brown), n. s.

St. t. elongata, haud rapide augente; vertice nucleoso magno, anfr. ii. et dimidio, tumentibus; habitu increscentis subregulariter arcuato, interdum vix tortuoso; superficie lævi, seu lineis increscentibus concentricis; apertura haud contracta, haud tumida.

Long. .08, lat. tubæ .008—.015.

Lat. verticis .01—.014.

Hab. Fossil in Eocene beds, Hempstead and Barton (*Edwards*). Mus. Brit.

Twenty-three specimens of this very interesting shell were found by Mr. Edwards, and were alluded to by Searles Wood and by Forbes and Hanley: their peculiarities, however, do not seem to have been recorded till the present time. There is no trace of plug in the few specimens which have lost the nuclear whorls. Only one specimen was found from Barton, with one of the next species.

43. *STREBLOCERAS SOLUTUM*, n. s.

*St. t. elongata, tereti; vertice nucleoso minimo, anfr. ii. tumidi-
oribus; t. adolescente rapide augente, lævi; dein subito
lineis concentricis exillimis, creberrimis ornata, subcylindrica;
habitu increscentis subregulariter arcuato, seu vix tortuoso;
apertura haud contracta, haud tumida.*

Long. .082, lat. tubæ .004—.015.

Lat. verticis .0035—.004.

Hab. Upper Marine Beds, Hordwell, 6 specimens; Barton, 1 sp. (*Edwards & Higgins*). Mus. Brit.

Of this very distinct species, three broken specimens were found by Mr. Edwards in the Upper Marine beds at Hordwell, and one nearly perfect from Barton, along with *St. cornuoides*. Mr. Higgins was fortunate enough to find three specimens, of which two possessed the minute nuclear coils. These are not half the size that they are in the last species, though in the adult state it is a trifle the larger of the two. For about one-fourth of the entire length, the shell is smooth and increases rapidly: it then suddenly becomes minutely striated, and adopts the habit of growth of *St. cornuoides*.

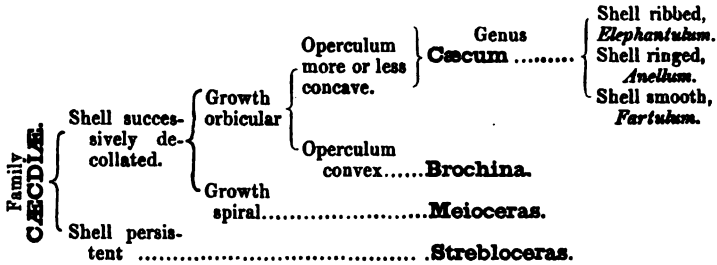
To assist the student in the identification of species, an abstract, giving the principal distinctive characters at a glance, is here appended.

ANALYSIS OF SPECIES.

Species.	Shape and Sculpture.	Mouth.	Operculum.	Plug.	Profile of Plug.	Locality.
1. <i>Cæcum</i> (<i>Elephantalum</i>) <i>subspirale</i> ..	very fine parallel striae; long ..	swelling ring ..	concave: fine spiral line.	muc. subdextr. subspir.	flat	Mazatlan.
2. ——— <i>abnormale</i>	very fine parallel striae; extremely short, and bent.	swelling ring ..	?	muc. dextral ..	flat	Mazatlan.
3. ——— <i>insculptum</i>	deeply cut square ribs	not swollen ..	?	ungulate	triangular	Mazatlan.
4. ——— <i>laqueatum</i>	fine ribs	not swollen ..	?	mam.-mucronate ..	convex, apex lateral ..	Panama.
5. ——— <i>obtusum</i>	fine ribs	not swollen ..	?	mam.-ungulate	convex, apex dorsal ..	Mazatlan.
6. ——— <i>plicatum</i>	short; sharp ribs, fine concentric striae ..	swollen	?	mucronate	flattened	W. Indies; Mauritius.
7. ——— <i>liratum</i>	very fine ribs	?	?	mucronate	flattened	Cor. Crag, fossil.
8. ——— <i>liracinctum</i>	ribs and obsolete rings near mouth	ringed	very concave: strong spiral rib.	muc.-ungulate	concave	Mazatlan; ? Singapore.
——— <i>var. tenuiliratum</i> ..	ribs very fine	ringed .....	.....	muc.-ungulate	less prominent ..	Mazatlan.
——— " <i>subobsoletum</i> ..	alabastrine; sculpture evanescent ..	ringed .....	.....	muc.-ungulate .....	.....	Mazatlan.
——— " <i>subconicum</i> ..	normal	ringed ..?	.....	muc.-ungulate	very prominent ..	Mazatlan.
9. ——— <i>heptagonum</i>	rounded rings, crossed by 7 corners.....	?	?	.....	?	Mazatlan.
10. ——— <i>imbricatum</i>	concentric furrows, 8-14 longitudinal corners.	not swollen ..	?	muc.-ungulate	concave	W. Indies.
11. ——— (<i>Anellum</i>) <i>annuletum</i>	large; strong rings, decussated	much swollen ..	?	mucronate	concave	W. Indies; Aden.
12. ——— <i>elongatum</i>	long; faint rounded rings	swollen	?	ungulate	triangular	Mazatlan.
13. ——— <i>var. semilæve</i>	rings and smooth spaces alternating ..	much swollen ..	?	ungulate	triangular	Mazatlan; ? Japan.
14. ——— <i>subimpressum</i>	long; close, faint, rounded rings	swollen	conc. : spiral rib	mucronate	subconcave	Mazatlan.
15. ——— <i>pulchellum</i>	stout round rings	not swollen ..	concave	mamillate	convex	N. England.
15. ——— <i>trachea</i>	close, faint, round rings; minutely decussated.	not swollen ..	conc. : spiral rib	ung.-mucronate ..	triangular	Europe, recent and fossil.
15b. ——— ? ——— <i>var. obsoletum</i> ..	small, slender, faint sculpture	not swollen ..	?	subungulate	concave	Ægean.
16. ——— <i>gurgulio</i>	stumpy; round rings not decussated ..	not swollen ..	?	mucronate	triangular	W. Indies.
17. ——— <i>tunidum</i>	heavily smooth	much swollen ..	?	mamillate	convex, apex lateral ..	Cor. Crag, fossil.
18. ——— <i>firmatum</i>	stout rings, subquadrate	not swollen ..	concave	ung.-mucronate ..	triangular	Panama; Mazatlan.
19. ——— <i>quadratum</i>	small; squared rings	not swollen ..	very concave: spiral line.	mucronate	concave	Mazatlan.
——— ? ——— <i>var. compactum</i> ..	stumpy; interstices evanescent	not swollen ..	?	mucronate	concave	Mazatlan.
20. ——— <i>clathratum</i>	large; distant, rather sharp rings ..	not swollen ..	?	mucronate	nearly flat	Mazatlan.
21. ——— <i>Floridanum</i>	sharp, distant rings	swollen	?	?	?	Florida.

22. — — — regular	large, slender ; sharpish rings	slanting, con- tracted.	?	mucronate	slightly convex	W. Indies ; Singapore ; Australia.
23. — — — gracile	very slender ; sharpish rings	swollen	?	?	dattened	Japan.
24. — — — elegantissimum	long, small, glossy ; distant sharp rings	not swollen	?	mucr.-ungulate	concave	Teneriffe.
24b. — — — ? — var. Searles-Woodii	long, small, glossy ; close obsolete rings	not swollen	?	ungulate	triangular	Teneriffe.
25. — — — undatum	stumpy ; distant, sharp rings	slanting	concave	ungulate	triangular	Mazatlan.
26. — — — (Farulium) leve	stumpy	slanting	concave	ungulate	triangular	Mazatlan.
27. — — — bimarginatum	stumpy	slanting	nearly flat ; dou- ble margin.	ungulate	triangular	Singapore ; Australia.
28. — — — farcimen	stumpy ; a few obsolete rings	slanting	slightly concave	ung.-mucronate	slightly swollen	Mazatlan.
29. — — — vitreum	slender	rather slanting	?	mucronate	slightly concave	Teneriffe.
29a. — — — ? — var. Clarkii	more slender	rather slanting	?	ungulate	swelling	Teneriffe.
30. — — — pollicare	more slender ; minutely corrugated	rather slanting	?	ungulate	triangular	Teneriffe.
31. — — — corrugulatum	more slender ; minutely corrugated	rather slanting	?	? mamillate	convex	Mazatlan.
32. — — — dextrovernum	large, slender	not swollen	slightly concave	mam.-ung. dextr.	very convex	Mazatlan.
32b. — — — ? — var. Antillarum	large, slender	not swollen	?	?	?	W. Indies.
33. — — — subquadratum	very small, slender	sharp	?	mam.-ungulate	subquadrate	Australia.
34. — — — reveraum	slender	sharp	?	mucr. reversed	rather convex	Mazatlan.
35. — — — teres	long, slender, slightly angulated	rather slanting	scarcely concave	mucronate	nearly flat	Mazatlan.
36. — — — mamillatum	long, solid	swollen	?	mucronate	very concave	Cor. Crag, fossil.
37. Brochina glabra	slender, small	sharp	convex ; spiral rib	mamillate	convex	Europe.
37b. ? — — ? —	slender, small	sharp	?	mamillate	convex	W. Indies.
38. ? — — glabriformis	slender, small	sharp	?	mamillate	very convex	Mazatlan.
39. Meioceras nitidum	extremely inflated	very slanting	scarcely concave ; strong spiral rib, distant whirls.	submucronate	triangular	W. Indies, rec. & fossil.
40. — — — cornu-copiae	slightly inflated	rather slanting	?	mucronate	concave	W. Indies.
41. — — — cornu-bovis	slightly inflated	rather slanting	concave ; strong spiral rib, close whirls.	ung.-mucronate	convex	W. Indies.
42. Strebloceras cornuoides	long, smooth ; large nucleus	sharp	?	0	0	Hemphstead, Eoc., fossil.
43. — — — solum	slender ; small nucleus	sharp	?	0	0	Barton, Eocene, fossil.

ANALYSIS OF GENERA.



4. DESCRIPTION OF RIAMA, A NEW GENUS OF LIZARDS, FORM-
ING A DISTINCT FAMILY. BY DR. JOHN EDWARD GRAY,
F.R.S., F.L.S., V.P.Z.S., PRES. ENT. SOC. ETC.

(Reptilia, Pl. XV.)

Mr. Louis Fraser has lately sent to the British Museum a considerable series of Lizards, Snakes, and Toads and Frogs from Guayaquil, in spirits. Among other interesting species is an annulated Lizard, which, as it cannot be referred to any of the existing families, and has a very peculiar external appearance, must at the same time be considered as the type of a new genus and new family.

This Lizard belongs to the section of *Cyclosauræ*, which have a distinct longitudinal fold along each side like the *Zonuridæ*; but it differs from the animal of that family in all the scales of the body and tail being elongate, four-sided, placed in transverse rings and regular longitudinal series, like the scales of the *Amphisbænidæ*, while the scales of the back and tail of the *Zonuridæ* are all rhombic and more or less distinctly keeled. It differs from the *Amphisbænidæ* in having an elongated head, four distinct moderately strong limbs (each furnished with five toes armed with claws), and broad square shields on the central part of the belly and tail.

It differs from the genera of the *Chalcidæ* in the position of the nostril (which in the genera of this family is large and placed in the suture between the lower edge of the nasal and the upper edge of the labial shield), and in the presence of exposed ears, which in that family are entirely hidden under the skin.

These animals have the general form of the Lizards—their elongated head furnished with regular shields, well developed eyes covered with eyelids, well developed legs and feet, and a bifid tongue with acute lobes, combined with small regular square or rather elongated four-sided scales forming rings round the body. The scales of the different rings are arranged in regular longitudinal series, smooth, impressed, not imbricate one over the other, but like those of *Amphisbæna*: indeed on looking at its back it might be almost taken for



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West imp

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1 Argalia dircea 2 Bama unicolor

an *Amphisbæna* furnished with short legs; but, unlike those animals, the scales of the middle of the belly and the middle of the under side of the body are of the same length, but twice as wide, as the other scales, forming equal-sided square shields like those of the true *Lacertidæ*.

Their general appearance would lead one to the idea that they may form a group intermediate between the *Amphisbæna* and the *Zonuriform Lizards*, but evidently more nearly allied to the latter.

Family RIAMIDÆ.

The characters of the genus.

Genus RIAMA.

Head elongate, with regular shields; labial shield short, broad. Chin and gullet with large shields. Tongue scaly; apex bifid; lobes acute. Nostrils lateral, in the front part of a single plate. Eyes distinct, furnished with eyelids. Ears sunken, covered with small scales. Throat with several distinct collars, the hinder largest. Body and tail elongate, cylindrical; sides with a narrow impressed groove extending from the axilla to the groin. The scales of the back, sides of the belly, and upper part and sides of the tail, square, elongate, four-sided, narrow, placed in equal-sized regular transverse rings and longitudinal series; of the middle of the belly and under side of the tail, broader (about twice as broad as the others), square. Legs four, short, moderately strong. Toes 5 · 5: the front short, subequal, claws short, blunt; the hind ones unequal; the inner very short, rudimentary; the outer elongate, placed lower on the foot than the rest, claws longer, acute. Femoral pores few, distinct. Tail elongate, cylindrical, rather fusiform, tapering to a fine point. Vent with two arched series of squarish shields in front.

The rings of dorsal scales are rather interrupted over the vertebral line: on the nape between the shoulders and on the front part of the back there is a line, or two or three series, of small scales; but these gradually become fewer and fewer, and in the hinder part of the back the rings of scales are only interrupted by a very narrow sinuous impressed line, which terminates over the loins. I am not certain whether this interruption of the rings is a character common to the genus, or a peculiarity of the individual under examination; it is not to be observed on the upper surface of the tail. A very narrow, indistinct, impressed line is generally to be observed in the same situation in the genus *Chirotes*, and in some specimens of *Amphisbæna*.

The fronts of the fore legs and thighs are furnished with large flat shields; the rest of the legs, groin, and axillæ are covered with small granular scales. The head has three single shields, the second and third being separated by a frontal pair, placed between the hinder parts of the last of the three pairs of superciliaries; the sides of the head are covered with three pairs of large polygonal shields; the temples with small polygonal shields.

RIAMA UNICOLOR. (Pl. XV. fig. 2.)

Uniform lead-coloured in spirits; tail longer than the body and head, tapering to a fine point.

Hab. Ecuador (*Mr. Louis Fraser*).

Length: body and head $2\frac{1}{2}$, tail $3\frac{1}{4}$ inches.

It may be observed, that though the genera of the family *Chalcidæ* all agree in the form and situation of the nostrils between the nasal and labial shields, and in the absence of the external ear, they present two very distinct forms of scaling, forming at least two tribes. Thus:—

1. The scales elongate, subquadrate, pointed behind; the scales in the rings alternating with each other, the points of the scales of one ring being opposite to the suture between the scales in the next ring.—*Brachypodina*: *Brachypus*.

2. The scales elongate, subquadrate, truncated at the end; the scales of the different rings opposite each other, forming longitudinal as well as transverse lines. The ventral and subcaudal shields broader than the rest.—*Chalcidina*: *Chalcis*—the first having the shield like *Chirocolidæ* and *Anadiadæ*, and the second like *Cercosauridæ* and the genus *Riama* here described.

Another genus of this family named *Bachia*, which is not in the British Museum, is described as having narrow, smooth, six-sided shields on the back, in nineteen longitudinal series.

EXPLANATION OF PLATE XV.

Fig. 1. *Argania olivacea*, P. Z. S. 1847, p. 97. From Venezuela.

Fig. 2. *Riama unicolor*.

All natural size.

November 9, 1858.

Dr. Gray, F.R.S., V.P., in the Chair.

The following papers were read:—

1. CHARACTERS OF FIVE NEW SPECIES OF AMERICAN BIRDS.
BY PHILIP LUTLEY SCLATER, M.A.

1. *EUCHLORNIS FRONTALIS*, sp. nov.

Psittaceo-viridis, fronte et gutture flavis; alis caudaque intus nigris, extus viridi limbatis; secundariis albo anguste termina-

crisso pallide rufescentibus: rostro nigro, mandibula inferiore ad basin brunnescente, pedibus brunneis.

Long. tota 8·0, alæ 4·1, caudæ 3·3, tarsi 1·2.

Hab. In Bolivia (*Bridges*).

Mus. Derbiano et Brit.

This fine species of *Cinclodes* is quite typical in form, though it departs somewhat in colouring from the uniform appearance of *Cinclodes patagonicus* and its allies. In this respect it approaches *Cinclodes palliatus* (Tsch.), and I was at first almost inclined to believe that it might be referable to that species. It is in fact just reconcilable with the characters, as given in Tschudi's 'Conspetus Avium' (Wiegmann, Arch. 1844, p. 281). But turning to the Fauna Peruana, we find a plate representing a bird with the apical portion of all the tail-feathers white. On the other hand, in the letterpress of the same work, the tail-feathers are described "*an der Basalhälfte rein weiss, im übrigen Verlaufen schwarz*," and in the following sentence "*Schwanz schwarz*." I cannot undertake to reconcile these three conflicting accounts of the colouring of the tail-feathers; but if any one of the three be correct*, the present bird must be quite different. It may further be noticed that the underside of Tschudi's species is represented both by figure and description as "*pure white*." The two white bands in the wing of *Cinclodes bifasciatus* are formed, one by the bend of the wing and distinct exterior edging of the feathers of the spurious wing being white, and the second by a broad white space, which occupies the basal portion of all the secondaries except the outermost, and passes obliquely across the inner primaries, terminating at the fourth from the outside, and leaving the three outer primaries wholly unmarked. The fourth primary is marked only on the inner web. There is a specimen of this bird in the British Museum, from the same origin as the bird described.

2. LIST OF BIRDS COLLECTED BY MR. LOUIS FRASER, AT CUENCA, GUALAQUIZA AND ZAMORA, IN THE REPUBLIC OF ECUADOR. BY PHILIP LUTLEY SCLATER, M.A.

(Aves, Pl. CXLV.)

I have the pleasure of exhibiting some new birds belonging to the first collections sent home by Mr. Fraser (our corresponding member) from the journey he is now making in the Andes of Ecuador, and pointing out the characters by which they may be distinguished. I subjoin also a complete list of the species obtained, as well for the preservation of the localities, which are always accurately marked, as on account of the value of the notes on the habits, food, &c. taken from Mr. Fraser's MS. which I thus have the opportunity of making public.

* For other instances of the untrustworthiness of the plates of Tschudi's book, see P. Z. S. 1854, p. 248, & 1858, p. 75. Dr. Günther informs me that the *Batrachia* there figured are also quite irreconcilable.

Mr. Fraser's first collecting-place was Cuenca, the capital city of the province of the same name, situated on a branch of the Rio Matadero, and on the eastern slope of the great watershed, at an elevation of about 8200 feet above the sea-level. Birds here were very scarce, and during a residence of parts of October and November in 1857 and March, April, and May of the present year only twenty-seven species were procured, namely—

<i>Hypotriorchis columbarius.</i>	<i>Sayornis cineracea.</i>
<i>Otus crassirostris.</i>	<i>Serpophaga cinerea.</i>
<i>Turdus gigas.</i>	<i>Elania, sp.</i>
— <i>chiguanco.</i>	<i>Petrochelidon cyanoleuca.</i>
— <i>swainsoni.</i>	<i>Petasophora iolata.</i>
<i>Conirostrum fraseri, sp. nov.</i>	<i>Calothorax fanniae.</i>
<i>Tanagra darwini.</i>	<i>Lesbia gracilis.</i>
<i>Pheucticus chrysogaster.</i>	— <i>amaryllis.</i>
<i>Zonotrichia pileata.</i>	<i>Zenaida hypoleuca.</i>
<i>Phrygilus ocularis, sp. nov.</i>	<i>Columbula cruziana.</i>
<i>Catamenia analoides.</i>	<i>Glottis melanoleuca.</i>
<i>Chrysomitris, sp.</i>	<i>Tringa — ?</i>
<i>Sycalis, sp.</i>	<i>Tringoides macularius.</i>
<i>Sturnella bellicosa.</i>	

Of these eight or nine, such as *Zonotrichia pileata*, *Petrochelidon cyanoleuca*, *Glottis melanoleuca*, &c. are birds of wide distribution; *Turdus gigas*, *Lesbia amaryllis*, and *Chrysomitris spinescens* are New Granadian forms, occurring in collections from Bogota; but the remainder may be pronounced to be mostly Peruvian, having been found, where their localities are known, in the Andes of that republic. Two only, a *Conirostrum* and a little finch of the peculiar S. American genus *Phrygilus*, appear to me to be undescribed. It may be remarked that this spot being probably in what Tschudi calls the "eastern Sierra region," not a single bird of the great S. American families *Formicariidæ*, *Cotingidæ*, or *Anabatidæ* occurs, and only one Tanager (*Tanagra darwini*) found by Tschudi in the western maritime region of Peru.

At Gualaquiza and Zamora, both situated much lower down in the eastern wood-region on different branches of the Rio S. Iago, Mr. Fraser passed the months of December, January, and February. Here the ornithology is totally different, only four of the species met with at Cuenca occurring again, and members of all the three typical families above mentioned being found. Of the sixty-two species obtained here, though there are several interesting birds amongst them, the generality are well known and of rather wide distribution, occurring either in collections from Bogota or from the Upper Amazon. Three only I can at present venture to characterize as unnamed; but there are several others belonging to the difficult group *Tyrannidæ*, which may ultimately prove to be new.

1. HYPOTRIORCHIS COLUMBARIUS (Linn.) ♂.

Cuenca, November 1857. The most southern locality yet re-

corded for this species. "From the topmost branch of a large tree whence I had disturbed some doves (*Zenaida hypoleuca*). Irides hazel."

2. *BUTEO PENNSYLVANNICUS* (Wilson) ♂.

Gualaquiza. Irides dirty-white; cere, legs, and feet orange. Exceedingly shy. Appeared to be feeding on the ground. In the stomach were fish-scales, locusts, beetles, and frogs.

3. *IBYCTER AMERICANUS* (Bodd.), Pl. Enl. 417.

Gualaquiza. Mandibles yellow, cere blue; face, throat, legs, feet and irides deep red. In the gizzard, beetles and other insects. "A very active noisy bird. Having killed one out of three together among the high trees in the deep forest, the others made a great noise, screaming and crying round about. The second fell wounded, and his cries made the third an easy prey." Xivaro name, "Fa-cacoo;" Spanish, "Catacao."

4. *ASTURINA MAGNIROSTRIS* (Gm.).

Gualaquiza, ♀. "Irides deep yellow; cere and face orange; bill bluish base, black towards the tip; legs and feet orange."

5. *BUBO CRASSIROSTRIS*, Vieill.

Cuenca, ♀. "The stomach contained hair and bones of small mammals. Irides orange."

6. *TURDUS GIGAS*, Fraser, P. Z. S. 1840, p. 59.

Cuenca. Bill and legs orange. Agrees with New Granadian specimens from Bogota.

7. *TURDUS CHIGUANCO*, Lafr. et D'Orb.; D'Orb. Voy. p. 201, pl. 9. f. 2.

Irides light hazel; bill, legs, feet, and claws yellow. "A smart, active, upright bird, seen in pairs about the meadow-lands."

8. *TURDUS ALBIVENTRIS*, Spix, Av. Bras. i. pl. 69; Cab. Mus. Hein. p. 4.

Zamora, ♂. A single specimen: hardly differs, except in rather shorter tarsi, from examples of *T. albiventris* from Cayenne.

9. *TURDUS SWAINSONI*, Cab. in Tsch. F. P. p. 188. — *Turdus minimus*, Lafr.; Sclater in P. Z. S. 1855, p. 145.

Gualaquiza and Cuenca.

I am not prepared to point out any difference between S. American and N. American specimens.

10. *MYIODICTES CANADENSIS*, Aud. B. Amer. pl. 72; P. Z. S. 1855, p. 143.

Gualaquiza and Zamora.

11. DACNIS CAYANA (Linn.).

Gualaquiza.

12. DACNIS ANGELICA, De Fil.

Gualaquiza.

13. CHLOROPHANES ATRICAPILLA, Vieill.

Gualaquiza, ♀.

14. CERTHIOLA LUTEOLA, Cab. Mus. Hein. p. 97.

Zamora and Gualaquiza; sexes alike, but female smaller. "Gizzard soft, like that of *Trochilidæ*, and containing insects."

15. CONIROSTRUM FRASERI, sp. nov.

Supra viridescenti-cinereum, superciliis elongatis et corpore subtus fulvis; alis caudaque nigris grisescente limbatis; tectricum majorum et secundariorum marginibus externis cum macula primariorum basali albis; rostro et pedibus nigris; tectricibus subalaribus albis.

Long. tota 4·5, alæ 2·25, caudæ 2·0.

Cuenca, ♂ et ♀ alike. Irides hazel, bill, legs, and feet nearly black: contents of stomach minute insects.

This apparently new species of *Conirostrum* (which I have the pleasure of dedicating to its discoverer) seems most nearly allied to the Bolivian *C. cinereum* (D'Orb. Voy. pl. 59. f. 1). I have not had an opportunity of comparing it with authentic specimens of this species, but as far as I can judge from the figure and description of D'Orbigny, the present bird may be at once distinguished by its fulvous supercilia and under surface, and the want of the black head. The *Conirostrum fraseri* will form a fifth species of this limited group, of the known members of which I have already given a list in these Proceedings (see P. Z. S. 1855, p. 75). There are two examples of this bird in the Derby Museum at Liverpool, both collected by Delattre, one of which is marked "Lima" and the other "Guyaquil," and I have also noticed a specimen in Sir William Jardine's collection, transmitted from Ecuador by Professor Jamieson.

16. PROCINAS OCCIDENTALIS, Sclater, P. Z. S. 1854, p. 249.

Zamora, ♀; one ex. from the top of a tall bush. Ovaries full, stomach empty.

17. EUPHONIA XANTHOGASTRA, Sund.

Gualaquiza, ♂, from the top of a large Guarumba tree. Irides very dark hazel.

18. CALLISTE CYANEICOLLIS, (Lafr. et D'Orb.); Sclater, Mon. Calliste, pl. 38. p. 87.

Gualaquiza and Zamora, Dec. and Jan. Irides dark hazel. "Frequents the tall trees in parties of three or four individuals. The

skin of this bird is worn as an ornament by the natives, suspended from the neck. Stomachs contain small seeds and vegetable matter."

19. *CALLISTE SCHRANKI* (Spix); Mon. Calliste, pl. 8. p. 17.

Gualaquiza and Zamora, Jan. 1858. Males with testes developed. "Irides dark hazel; bill black, legs and feet bluish; food vegetable matter. Found in the tall trees. Also used by the Xivaros as an ornament."

20. *CALLISTE YENI* (Lafr. et D'Orb.); Mon. Calliste, pl. 2. p. 5. Gualaquiza.

21. *CALLISTE GYROLOIDES* (Lafr.); Mon. Calliste, pl. 26. p. 57. ♀ juv. Zamora. In the stomach, vegetable matter.

22. *TANAGRA CŒLESTIS*, Spix.

Gualaquiza, Dec. ♂ with testes enlarged; irides dark hazel. In the stomach, insects, seeds, and vegetable matter.

23. *TANAGRA DARWINI*, Bp.

Tanagra darwini, Bp. P. Z. S. 1837, p. 121.

Tanagra frugilegus, Tsch. Av. Consp. in Wiegmann Archiv. 1844, p. 286; Faun. Per. pl. 17. f. 1. p. 204; Hartl. Rev. Zool. 1849, p. 286.

Calliste frugilegus, Bp. Consp. p. 236.

Chrysotrampus frugilegus, Bp. R. Z. 1851, p. 143; Note s. l. Tang. p. 22.

Aglaia striata, Darwin, Zool. Beagle, p. 97 (partim).

Tanagra striata, Sclater, P. Z. S. 1856, p. 236 (partim).

Cuenca, many specimens ♂ et ♀. Indian name "*Chuci-chugo*." Tongue fleshy, round, and pointed; irides hazel. Feeds on the '*capuli*' or wild Indian cherry.

Mr. Fraser has transmitted some examples of this Tanager in spirits, which have served to clear up the mysteries of its relationship to *Tanagra striata*. In my Synopsis of this group I have followed Mr. G. R. Gray in considering the present blue-backed bird as the female of the latter. But an anatomical examination shows that this is an error, and that the *Tanagra darwini*, as described by Bonaparte, is in fully adult male plumage. It appears, therefore, that this is a western species, and *Tanagra striata* its eastern representative. Tschudi found this bird in the fruit-gardens of Lima, and Sir William Jardine has specimens sent by Professor Jameson from the Table-land of Quito.

24. *TANAGRA MELANOPTERA*, Hartl.

Gualaquiza. Solitary: high up in large trees: in stomach, seeds and vegetable matter.

25. *RAMPHOCELUS UNICOLOR*, Sclater, P. Z. S. 1856, p. 128.

Gualaquiza and Zamora (Dec. 57, Jan. 58). Very active, always

on the move, frequenting the more open trees round the houses in threes and fours, and the bushes: common. In stomach, seeds and vegetable matter.

26. *LANIO ATRICAPILLUS* (Gm.).

Gualaquiza, 1 sp. ♂, testes developed, Jan. 1858. Irides dark hazel; bill, legs, and feet black. "On a large tree in the thick forest. Stomach contained insects: testes large: Xivaro name *Chee-hay*."

27. *CISSOPIS MINOR*, Tsch. ♀.

Gualaquiza, Dec. 1857. "Irides straw-colour: bill, legs, and feet black: has a loud shrill cry: frequents the bare tops of high trees, generally in pairs. Stomach contained vegetable matter."

28. *PHEUCTICUS CHRYSOGASTER* (Less.). — *Pitylus chrysogaster*, Less. Cent. Zool. pl. 67 (1830); *Coccothraustes chrysopleus*, Vig. P. Z. S. 1832, p. 4; *Coccyoborus chrysopleus*, Bp. Consp. p. 504.

Cuenca, Oct., Nov. 1857. Common in the gardens in the town; to be seen constantly, perched on the topmost branch of some small naked tree, sending forth its pretty little song. Stomachs contain seeds, pieces of Indian wild cherry, 'capuli,' and peas. Called "Chugo." Irides dark hazel; upper mandible blackish, lower yellowish; legs and feet lead-colour; claws brown.

29. *ZONOTRICHIA PILEATA* (Bodd.).

Cuenca, Nov. 1857. Common everywhere, about the houses, on the trees, bushes, &c. The boys brought me a nest containing young. Spanish name 'Gorion.'

Mr. Fraser has sent a nest of this bird containing two eggs, taken in March, "hard set." The nest is neatly built of coarse dried grass and stalks, lined with finer materials, and some hairs. It is open and cup-shaped. The eggs are pale greenish, spotted and blotched, principally at the larger end, with pale reddish brown: long diameter .83, short diameter .61 inches.

30. *PHRYGILUS OCULARIS*, sp. nov. (Pl. CXLV. ♂ et ♀).

♂. *Cærulescenti-cinereus; dorso medio fusco, nigricante-flammulato; alis caudaque nigricantibus, illarum secundariis fusco, tectricibus et primariis anguste cinereo limbatis; loris albidis; oculorum ciliis supra et subtus albis: subtus albus, pectore et lateribus cinerascens lavatis; rostro supra nigricante, infra carneo, apice nigricante; pedibus carneis.*

♀. *Supra fusca, nigricante flammulata; infra albida: pectore fuscescente, nigricante-flammulato.*

Long. tota 4.75, alæ 2.5, caudæ 1.9.

Cuenca, 7 specimens.

Tschudi's *Phrygilus plebeius* seems to be nearly allied to this species, but the describer says nothing of the very noticeable white

eye-marks. "Common in flocks about the houses as well as in the fields: small seeds in stomach." Spanish name, '*Triguero*.'

31. *COTURNICULUS PERUANUS*, Bp. Consp. p. 481.

Gualaquiza. "Sexes alike; frequents the piles of brushwood near the houses, running in and out. Xivaro name, '*Pincho-chinchi*.'" Irides light hazel. Gizzard contains seed and insects.

A distinct species from *C. manimbe*, easily recognized by its yellow lores and flexure.

32. *CATAMENIA ANALOIDES* (Lafr.); Bp. Consp. p. 493.

Cuenca. Gizzard contained seeds. Among the bushes on the banks of the river.

33. *ORYZOBORUS TORRIDUS* (Gm.); Cab. Mus. Hein. p. 151 ♂.

Zamora. Sings very prettily. In the gizzard, yellow vegetable matter.

34. *SPERMOPHILA LUCTUOSA* (Lafr.); Bp. Consp. p. 497.

On the bushes and dead fence near the house, Gualaquiza and Zamora. In the gizzard, seeds.

35. *CHRY SOMITRIS* — ?

Cuenca. From a flock of the same species among trees and bushes. Gizzard contains small seeds and grit.

36. *SYCALIS* — ?

Cuenca.

37. *OSTINOPS CRISTATA* (Gm.); Cab. Mus. Hein. p. 187 ♂.

Gualaquiza, Dec. 1857.

Irides light blue, bill lemon-colour; legs and feet black. "This bird perches himself on the bare topmost branches of the loftiest tree, and throwing himself far forwards and backwards, with wings and tail fully extended, gives forth his very loud and distinct notes of "Büggle, büggle, büggle," with his head hanging down. They live in society, and construct hanging nests, attached to the lower branches of a lofty palm, the trunk of which is covered with very sharp spines, which render it impossible to ascend. Now inhabiting their nests as if breeding. The gizzard contained small grasshoppers." Xivaro name, '*Churi*'; Spanish, '*Bugglas*.'

38. *CACICUS ICTERONOTUS*, Vieill.

Gualaquiza. "Feeding, like the Tanagers, in a Guarumbo tree. Very wary."

39. *STURNELLA BELLICOSA*, De Filippi, Cat. Mus. Mediol. p. 32 (1846).—*Pezites brevirostris*, Cab. Mus. Hein. p. 191.

Cuenca,—'*Chirote*,' ♂ et ♀. "This species is always solitary, perching in small trees and bushes: it is very squat in form. The

male is celebrated for his song, and the Cuencans often pay as much as 4 or 5 dollars for specimens in confinement." Stomachs contain Indian corn, small seeds, and grit.

There has been much confusion among the birds allied to the *Sturnus militaris* of Linnæus. Prince Bonaparte in his 'Conspectus' has rightly distinguished three species, but has, as I believe, partly misapplied the names and given wrong localities. The true *Sturnella militaris* is well characterized by him as much the largest and longest billed bird. There are numerous specimens of this species in the British Museum from East Falkland and Patagonia. It has the under wing-coverts white. The present smaller species, with the under wing-coverts, also white, was first recognized by De Filippi, and appears also to be Cabanis' *brevirostris*. One specimen in the British Museum is from Delattre's expedition in 1846 to Peru and New Granada. The third species is easily recognized by its black under-wings. Two specimens in the British Museum are said to be from Chili. If this is so, this species is more likely to be the *Sturnus loyca* of Molina.

40. *CYANOCORAX VIOLACEUS*. DuBus, Esq. Orn. pl. 30; Sclater, P. Z. S. 1855, p. 153.

♂ et ♀ similes. Gualaquiza and Zamora. "A shy but noisy bird, cawing like a crow in the large trees in the deep forest. On a female being shot from a Guarumba tree, where a pair were in company with some Bugglas (*Ostinops cristata*), the male flew several times close round my head. The gizzard contained seeds and vegetable matter."

41. *DENDROORNIS* — ? ♂.

Gualaquiza. "Runs up and down the limbs of the large trees like a Woodpecker."

42. *ANABATES RUFICAUDUS*, Lafr. et D'Orb. Syn. Av. pt. 2. p. 15; Sclater in P. Z. S. 1856, p. 26.

Gualaquiza. "Irides dark hazel; bill blackish above, greenish beneath. Among the large trees in the deep forest, running up and down the limbs like a Woodpecker. Gizzard contained insects."

43. *ANABATES* — ?

Gualaquiza, ♂. "Sometimes running up the bark of the trees in the forest, at other times perching."

Allied to *A. atricapillus*, Max., from Brazil, but probably distinct. Only a single specimen sent.

44. *SYNALLAXIS ALBIGULARIS*, Sclater, P. Z. S. 1858, p. 63.

Zamora, ♂. Irides light hazel. Contents of the stomach—caterpillars, beetles, &c. "Always heard, but seldom seen, creeping about in the very thickest bush close to the ground, and repeating its note of *chink, chink*."

45. *SYNALLAXIS ANTISIENSIS*, sp. nov.

Supra terricolori-brunnea; loris, ciliis et striga superciliari albis; pileo, alis extus et cauda rufis: subtus dilutior, gutture et pectore antico albis, hoc sensim ventrem versus cinerascens; rostro carneo, supra nigricante; pedibus nigricanti-fuscis.

Long. tota 6.1, alæ 2.8, caudæ 3.0.

Cuenca, Nov. 1857, 1 specimen. "Irides hazel; legs and feet greenish; nails flesh-coloured. Climbs up and down and round the branches of trees like a *Certhia*."

This apparently new *Synallaxis* is most nearly allied to *S. pallida*, Max., but may be distinguished by its larger size, white throat, and earthy-brown plumage.

46. *SYNALLAXIS BRUNNEICAUDIS*, Sclater, P. Z. S. 1858, p. 62.

Zamora, ♂.

47. *XENOPS GENIBARBIS*, Ill. Prod. p. 213; Bp. Consp. p. 211.

Gualaquiza. A single imperfect specimen.

48. *THAMNOPHILUS ÆTHIOPS*, Sclater, P. Z. S. 1858, p. 65.

Zamora, 2 spec. ♂. Irides light hazel; bill black; legs and feet blue. "Creeping about in the underwood of the deep forest. In the stomach, insects and their eggs." Xivaro name, '*Pong-gah*.'

49. *THAMNOPHILUS DOLIATUS*?

Zamora, ♂, 2 sp., one "from the upper part of the latter bushes," another "from a tall Guarumba tree." Stomachs contained "beetles and other insects."

These specimens are generally darker than *T. doliatus*, but I do not venture to separate them at present.

50. *DYSITHAMNUS PLUMBEUS* (Max.).

Zamora. Apparently rather stronger than Brazilian specimens, but only one example sent.

51. *PIPPA AURICAPILLA*, Licht.

Gualaquiza, Jan. 1858. ♂ testes very large. Irides white, bill, legs, and claws nearly so. One ex. "killed inside the house."

52. *TYRANNUS MELANCHOLICUS*, Vieill.

Gualaquiza, 4 specs. all ♀. In one, contents of stomach red berries; in another, green and black Coleoptera. Irides very dark hazel.

53. *SAYORNIS CINERACEA* (Laf.).—*Tyrannula cineracea*, Laf. Rev. Zool. 1848, p. 8 (?).

Cuenca, "Golondrina de Agua," or "Water-swallow." On the banks near the river, and one specimen on the stones in the river. Irides black.

These specimens are rather darker than others in my collection from S. Martha and Caraccas.

54. *TODIROSTRUM CINEREUM* (Linn.).

Zamora, ♂, one specimen.

55. *SERPAPHAGA CINEREA* (Strickl.).—*Euscarthmus cinereus*, Strickl. Ann. N. H. 1844, xiii. p. 414.

Cuenca, 4 ex., Gualaquiza, 1 ex.; "Patito del Agua." Xivaro, "Misquet." "Hopping from stone to stone in the Gualaquiza river." "Found amongst the bushes and stones on the banks of the river." Irides dark hazel.

56. *ELÆNIA CAYENNENSIS* (Linn.), Pl. Enl. 569. f. 2.

Gualaquiza and Zamora. Found on the topmost branches of tall trees in twos and threes, whence they fly upwards, and forming a circle of nearly 6 feet in diameter, seize their prey and return to their post again. In the stomach of one example, "two large green berries—no insects."

57. *ELÆNIA* — ?

Cuenca. A single specimen of a species nearly allied to *E. pagana* and *E. olivacea*. Stomach contained "capuli (wild Indian cherry) and insects."

58. *ELÆNIA* — ?

Zamora, 1 ex. imperfect.

59. *MYIOBIUS* — ?

Gualaquiza, 2 ex. "A lively active little bird, frequenting the uppermost branches of the large trees overhanging the water."

59*. *MYIOBIUS* — ?

2 ex., Zamora and Gualaquiza. Irides dark hazel. Gizzard contained insects.

60. *ORNITHION* — ?

Zamora, 1 ex. Killed among the creepers round the trunk of a large tree.

61. *TYRANNULUS CHRYSOPS*, sp. nov.

Olivaceus; alis nigricantibus omnino flavo marginatis; cauda nigricanti-brunnea extus olivascens; fronte et ciliis oculorum aureis: subtus flavescens-albidus medialiter dilutus; tectricibus alarum inferioribus et carpo pallide flavis; rostro et pedibus nigricanti-brunneis.

Long. tota 3·6, alæ 2·8, caudæ 1·4, rostri a rectu ·45, tarsi ·60.

Gualaquiza and Zamora, 2 ex. Irides hazel. "High up in a large tree at the river side: contents of stomach, hard green berries entire;" in another, "hard green seeds."

Agrees in form with *T. elatus*, Spix, nearly enough to be placed in the same genus. Third and fourth primaries equal and longest.

62. EMPIDONAX — ?

Zamora, 2 ex. Stomach contained beetles and other insects.

63. CONTOPUS — ?

Gualaquiza, 1 ex. Stomach contained insects.

64. CONTOPUS BOGOTENSIS, Bp. Consp. p. 190.

Obscure olivascens-brunneus, pileo intensiore; alarum tectricibus minoribus et majoribus cum secundariis pallido ochraceo-cinereo extus limbatis, itaque alis bifasciatis; remigibus rectricibusque nigricanti-brunneis: subtus pallide flavicanti-cinereus, gula et abdomine imo dilutioribus et fere albescentibus; rostri mandibula superiore nigra, inferiore carnea, pedibus nigris.

Long. tota 5·9, alæ 3·6, caudæ 2·6, rostri a rictu 0·7, tarsi 0·5. ♀ paulo minor.

Obs. Contopodi virenti ex Am. Bor. maxime affinis et forsā vix diversus.

Zamora and Gualaquiza, many specimens, all in moult.

This species is certainly very like the *C. virens* of the United States. But comparing it with the single specimen of that bird which I possess, I find the head not so dark, the edgings of the wings paler and more buffy, without any tinge of rufous, and the throat more white. And I can hardly believe that two species of this genus from such distant localities can be really identical.

65. PETROCHELIDON CYANOLEUCA (Vieill.).

Cuenca, 1 ex.

66. TROGON — ?

Gualaquiza, ♀, 1 ex.

67. TROGON — ?

Gualaquiza, 1 ex.

These Trogons are immature, and not in very perfect condition.

68. PETASOPHORA IOLATA (Gould).

Cuenca and Gualaquiza, many examples. Found among the hedges and on the cacti. At Cuenca common in March, found round large trees in the fields, generally solitary, and uttering a loud 'tweet, tweet,' like a grasshopper. Stomachs contained minute insects.

69. CALOTHORAX FANNIÆ (Less.); Gould, Mon. Troch. pt. xii. pl. 6.

Cuenca, Nov. 1857. "This species is common about the gardens and lane hedge-rows. It makes much more humming with its wings than the long-tailed green one." (*Lesbia*.)

70. *LOPHORNIS REGINA*, Gould.

Zamora, 1 ex. Irides black; mandibles reddish flesh-colour with black tips. Feeding on a large Guarumba tree.

71. *LESBIA AMARYLLIS*.

Cuenca, 1 ex. ♂. "I saw a male of this species attacking a male 'Chugo' (*Pheucticus chrysogaster*) most pertinaciously, flying into the air some 20 or 30 feet from the ground, and darting into the bushes where the enemy was. The *Chugo* had to retreat under cover."

72. *LESBIA GRACILIS* (Gould), P. Z. S. 1846, p. 86.

Cuenca, 5 ex.

"It is difficult to get a sufficient distance from these birds to shoot them, on account of their quickness and uneasiness of motion. They would seldom be seen but for their constant chirping and the humming of their wings."

73. *THALURANIA TSCHUDII*, Gould, MS.—*Trochilus furcatus*, Tsch. nec auct.

Irides dark hazel; bill and feet black. Gualaquiza and Zamora.

74. *CHRYSUROMIA GENONE* (Less.).

Zamora, 1 sp. ♂. Irides black.

75. *THAUMANTIAS LINNÆI*.

Zamora, 2 ex. ♂ et ♀. Feeding on the Guarumba trees. Irides black.

76. *PIAYA MEHLERI*, Bp.

Gualaquiza and Zamora, 3 ex. Irides red; naked space in front, behind and over the eyes red, below bluish flesh-colour. From the bush about 10 feet above the ground, and the thinly-clad trees. Stomachs contain *grylli*, beetles and insects.

77. *MELANERPES HIRUNDINACEUS* (Gm.).

Gualaquiza. Irides deep straw-colour.

78. *DRYOCOPUS ALBIROSTRIS* (Vieill.); Spix, Av. Bras. i. p. 56, pl. 45.

Gualaquiza. Irides orange.

79. *RHAMPHASTOS CULMINATUS*, Gould.

Gualaquiza, ♂.

80. *PIONUS MENSTRUUS* (Linn.).

Zamora, Jan. 1858, 1 ex., ♀, with an egg ready to lay. Irides black. "Sitting on a lofty solitary dead stump, I mistook it for a Falcon."

81. *ZENAIDA HYPOLEUCA*, Bp. Cons. ii. p. 83.—(sufficiently agrees with the type in the British Museum).

Gualaquiza and Cuenca. "Tortola." "Irides hazel, cere bluish flesh-colour; rim round the eyes greenish yellow; bill black; legs red."

82. *COLUMBULA CRUZIANA*, D'Orb.; Bp. Consp. ii. p. 80.

Cuenca, 1 ex. ♀. Beak black; cere yellow; irides red; legs red, claws black: contents of stomach very small seeds. 'Tortolita,' Spanish. "I saw nine together on the tiles of a house in Cuenca; also I observed it in the fields, sometimes in threes and fours, often solitary."

83. *GLOTTIS MELANOLEUCA* (Gm.).

Cuenca. Eyes black; bill green; legs deep orange.

84. *TRINGOIDES MACULARIUS* (Linn.).

Gualaquiza, ♀, 2 ex. Young birds, but the spots below are just discernible in one specimen.

85. *TOTANUS SOLITARIUS*, Wilson.

Gualaquiza, 1 ex. ♀. Irides dark hazel; bill blackish; legs dull green. Frequents the stones and margins of the river.

86. *TRINGA* — ?

Cuenca, Oct. 1857.

87. *TIGRISOMA TIGRINUM*.

Gualaquiza, Feb. 1858.

3. SYNOPSIS GENERIS FRINGILLINI ERYTHRURÆ, AUCTORE GUSTAVO HARTLAUB, MED. DOCT.

a. SPECIES TYPICÆ.

1. *ERYTHRURA PRASINA* (Sparm.). *Viridis, fronte guttureque dilute cyaneis, abdomine medio et cauda rubris.*

Hab. In Java et Sumatra.

Syn. *Loxia prasina*, Sparm. Mus. Carls. t. 72, 73.—*Emberiza quadricolor*, Gm. L. no. 65.—*Emberiza cyanopsis*, Gm. ibid. no. 66.—*Fringilla sphenura*, Temm. Pl. Col. 96.—*Erythrura viridis*, Sw. Confer Bp. Consp. p. 457.

2. *ERYTHRURA TRICHROA* (Kittl.). *Læte viridis; facie et regione parotica pulchre cyaneis; cauda breviuscula cum tectricibus superioribus rubra, rectricibus intermediis cærulescentibus.*

Hab. In ins. Ualan Carolinarum.

Syn. *Fringilla trichroa*, v. Kittl. Mem. Acad. Pet. 1835, ii. p. 8. t. 10, fig. bona.—*Erythrura trichroa*, Bp. Consp. i. p. 457; v. Kittl. Denkwürdigk. ii. p. 38.

3. *ERYTHRURA TRICOLOR* (Vieill.). *Læte viridis; fronte, genis et gastræo toto læte cyaneis; cauda parum elongata rubra.*
Hab. Timor (Mus. Paris. et Lugd.).
Syn. *Fringilla tricolor*, Vieill. Ois. Chant. pl. 20; id. Encyclop. p. 974.—*Erythrura tricolor*, Bp. Consp. p. 457.
4. *ERYTHRURA PSITTACEA* (Gm.). *Læte viridis; fronte, sin-
 cipite, gutture, uropygio et cauda coccineo-sanguineis.*
Hab. In Nova Caledonia.
Syn. *Parrot Finch*, Lath. Gen. Syn. iii. 287. pl. 48; id. G. H. vi. p. 81. pl. 96.—*Fringilla psittacea*, Gm. S. N. i. 903.—*Char-
 donneret acalanthe*, Vieill. Ois. Chant. pl. 32; id. Encycl. p. 982.—*Fringilla pulchella*, R. Forster, Descr. Anim., ed. Licht. p. 273.—*Erythrura psittacea*, Bp. Consp. p. 457.—*Poëphila Paddoni*, Mac-
 gilliv. Ann. & Mag. N. H. 1858, p. 273.
5. *ERYTHRURA PUCHERANII*, Bp. *Glauco-cyanea; pileo genis
 tectricibusque caudæ superioribus sanguineis.*
Hab. In insulis Oceanicæ.
Syn. *Erythrura Pucheranii*, Bp. Consp. i. p. 457.
6. *ERYTHRURA CYANOVIRENS* (Peale). *Viridis, nitore glauces-
 cente: capite coccineo: gutture pectoreque dilute cyaneis:
 tectricibus duabus intermediis totis rubentibus, reliquis in medio
 fuscescentibus in margine rubentibus.*
Hab. In. ins. Navigatorum Upolu.
Syn. *Geospiza cyanovirens*, Peale, Unit. St. Expl. Exp. Ornith. p. 117; Hartl. in Wieg. Archiv. xviii. p. 104.
7. *ERYTHRURA PEALII*, nob. *Læte viridis; pileo, regione paro-
 tica, et tectricibus caudæ superioribus scarlatinis; pectore pul-
 chre cyaneo, gulam nigricantem versus saturate indigotico;
 rectricibus nigricantibus viridi marginatis.*
Hab. In insulis Fee-jee.
Syn. *Geospiza prasina*, Peale, Unit. St. Expl. Exp. Orn. p. 116.
 —*Erythrura pealii*, Hartl. Wieg. Arch. xviii. p. 104.

SP. MINUS TYPICA.

8. *ERYTHRURA PHAETON* (Hombr. & Jacq.), Puch. Voy. au Pol. Sud. Ois. p. 99.—*Neochmia phaeton*, Hombr. & Jacq.; Bp. Consp. i. p. 458; Gould, B. Austr. iii. pl. 83; Reichenb. Vög. Neuho. p. 115.
Hab. In Australia Boreali.

4. NOTES ON THE HABITS OF THE SCYTHROPS NOVÆ HOLLANDIÆ. BY GEORGE BENNETT, ESQ., CORR. MEMB. ZOOL. SOC. COMMUNICATED TO JOHN GOULD, ESQ., F.R.S., V.P.Z.S., ETC., IN A LETTER DATED SYDNEY, JUNE 8, 1858.

"I send you a few notes on the *Scythrops Novæ Hollandiæ*, or

Hornbill Cuckoo of the Colonists, which, perhaps, you may think worth bringing under the notice of the Zoological Society.

"A few years since a fine female specimen was shot in the Botanical Garden at Sydney; and from the notes I took at the time I find that the peculiarity of its mode of flight induced me to mistake it for a Hawk; for it wheeled about, occasionally hovered very high in the air, and then gradually descending, continued its flight close to the tops of the lofty *Eucalypti*, *Casuarinæ*, and other large trees, as if for the purpose of capturing insects, more especially the *Tettigonia* or Locust, which at that season of the year (January) were very numerous. It also whirled round the trees in circles and from branch to branch, apparently to capture the *Tettigonia*s and other insects during their flight; and I further observed that it often darted down and took its prey among the foliage and on the trunks of the large *Eucalypti*, occasionally making a screaming noise and hovering with its wings expanded to the utmost, at a short distance above the trees, precisely as a hawk does. After making these various evolutions and securing its morning meal, it quietly perched itself on the very lofty branch, whence it was shot. On examining the stomach, it was found to contain Gold Beetles (*Anoplognathus*) and *Tettigoniæ* in great numbers. A young specimen formerly in the possession of Mr. Wall, the Curator of the Australian Museum, and now in the well-arranged and extensive aviary of Mr. Alfred Denison at Government House, Sydney, is in excellent health after recovering from a broken wing and broken leg.

"I observe you mention in your 'Birds of Australia' that a specimen was presented to you by Lady Dowling, being one of two taken from the branch of a tree while being fed by birds not of their own species: an important fact, as showing the parasitic habits of the bird. Now as the *Scythrops* is regarded as a member of the *Cuculidæ*, anything which tends to confirm the propriety of placing it in that group must be considered of great interest; I have much pleasure, therefore, in telling you that when the young *Scythrops* was introduced into Mr. Denison's aviary it was placed in a compartment already occupied by a *Dacelo gigantea*, and, doubtless feeling hungry after its journey, immediately opened its mouth to be fed; and its wants were readily attended to by the *Dacelo*, who with great kindness took a piece of meat, and after sufficiently preparing it by beating it about until it was in a tender and pappy state, placed it carefully in the gaping mouth of the young *Scythrops*; this feeding process continued until the bird was capable of attending to its own wants, which it now does, feeding in company with the *Dacelo* in the usual manner. When I saw it in the morning it was perched upon the most elevated resting place in the aviary, occasionally raising itself, flapping its wings, and then quietly settling down again after the manner of Hawks in confinement, and presenting much the appearance of a member of that tribe of birds. It comes down for food every morning, and immediately returns to its elevated perch. Judging from what I saw of this specimen, I should imagine that the bird might be very readily tamed and would bear confinement very

well. In the young state the bird is destitute of the scarlet orbits so conspicuous in the adult."

5. DESCRIPTIONS OF SOME BUTTERFLIES FROM THE COLLECTION OF MR. WALLACE. BY W. C. HEWITSON.

(Annulosa, Pl. LIV., LV.)

NYPHALIDÆ.

DIADEMA PANDARUS (Pl. LIV. figs. 1, 2).

♂ *P. Pandarus*, Lin.=*P. Calisto*, Cram. pl. 24.

♀ *P. Pipleis*, Cram. pl. 60=Hübner, Sammlung.

Although differing greatly in size and colouring from the figures of Cramer and Hübner, I have no difficulty in believing that the Butterflies here figured are varieties of the same species.

The insects previously figured are from Amboyna; these are from New Guinea, where, Mr. Wallace remarks, the Butterflies are generally smaller than those of Amboyna.

The male of the Amboyna insect is without the white band of the anterior wing; the female has it. The male now figured seems to represent the female of that insect. The upperside of the female here differs but little from the underside of Cramer's figure of the same sex. The undersides of both sexes of the Amboyna and New Guinea Butterflies are nearly identical.

I think it is not at all unlikely that the other figures in the plate, which I have preferred at present to consider as a distinct species, may be only another variety of *D. Pandarus*.

The insects of this genus are well known to be subject to great variation both in size and colour. *D. Lasinassa* has been figured by Cramer alone under thirteen different names; and I have no doubt that *P. Alimena*, pl. 221, and *P. Vitellia*, pl. 349, both of Cramer, are one and the same species.

Exp. $3\frac{6}{10}$ inches.

Hab. Ké Islands, near New Guinea.

All the insects of the plate are kindly lent to me from the private collection of Mr. Wallace.

DIADEMA DEOIS, Hewitson (Pl. LIV. figs. 3, 4, 5).

Upper side, male (fig. 4), dark brown. Anterior wing with an indistinct transverse band of lighter brown beyond the middle. Posterior wing with a large central rounded white spot, with, between it (touching it) and the anal angle, a rufous spot marked with two black eye-like spots, each with a central dot of light blue, two other indistinct black spots towards the costal margin touching the central white, each with a scarcely seen dot of blue.

Under side. Anterior wing as above, except that the central band is nearly white, that the wing beyond it to the apex is lighter brown, and that there is a black spot with a dot of blue near the anal angle.

Posterior wing, from the base to the central white spot, brown; the outer margin brown, traversed by a rufous line; the rest of the wing, except the central white spot, orange, with five blue-black eye-like oval spots, three near the apex, two near the anal angle, each with a single dot of light blue, except that which is nearest to the anal angle, which has two.

Female (fig. 3) brown. Anterior wing with a large central space of white reaching from the costal margin to nearly the outer margin; the nervures black. Posterior wing light brown, with a large central space of white; four black eye-like spots beyond the middle placed in pairs, three of them with the central dot of blue.

Under side (fig. 5) white, tinted with lilac beyond the middle. Anterior wing with a broad space of brown attached to the inner margin, from the base of the costal margin to near the outer margin, where it is marked by a black spot with two dots of blue. The outer margin and apex (which is traversed by a line of white) brown. A faint line of brown parallel and near to the outer margin. Posterior wing as in the male, but with less orange, the outer margin and a line near it brown.

Exp. $3\frac{1}{2}$ inches

Hab. Aru, New Guinea. In the collection of Mr. Wallace.

EURYTELIDÆ.

MELANITIS MELANE, Hewitson (Pl. LV.).

Upper side. Male (fig. 1) dark green or blue-brown, lighter at the margins. Anterior wing crossed near the apex by a curved band of light green. Posterior wing with a submarginal band of the same colour, broader towards the anal angle, where it is marked by two round black spots, each with a dot of light blue. Outer margin of both wings dentated, with bifid lunular white spots between each dentation.

Under side as above, except that it is rufous-brown, that the submarginal band of the posterior wing is orange near the anal angle, that there are three black eye-like spots (two on the orange), the spot nearest the anus marked with two dots of blue.

Female (fig. 2): upper side light rufous-brown, tinted with lilac towards the margins. Anterior wing with a large space of white beyond the middle. Posterior wing with two indistinct black spots dotted with blue between the median nervules. Under side as above, except that it is lighter, that the whole of the posterior wing (the costal and outer margins excepted) is of a dirty white, that there are three black spots dotted with blue (larger and more distinct than above) and surrounded with orange.

Variety: female (fig. 3) differs on the upper side from the last (which appears to be the most typical) as represented in the plate. On the under side it differs from that figure in having the costal margin broadly brown, the eye-like black spots surrounded with orange, the spot nearest the anal angle marked with two dots of light blue.

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Variety: female (figs. 4, 5) has (more than the other varieties) two indistinct black spots on the upper side of the anterior wing. On the under side there are three such spots (two only, dotted with light blue). On the under side of the posterior wing there is a fifth black spot.

Exp. ♂ $3\frac{2}{10}$ inches, ♀ $3\frac{6}{10}$ inches.

Hab. New Guinea.

Greatly as the four examples of the plate differ from each other, I cannot separate them, except in colour; their chief variation seems to consist in the differing distance of the eye-like spots from the outer margin. This may be noticed also in the genus *Drusilla*, in which the beautiful large eyes of the posterior wing vary much in their relative distance from the outer margin.

6. NOTES ON THE HABITS, HAUNTS, ETC. OF SOME OF THE BIRDS OF INDIA*. BY A. LEITH ADAMS, M.B., SURGEON 22ND REGIMENT. COMMUNICATED BY MESSRS. T. J. & F. MOORE.

The Vulture tribe is very generally distributed over India, and yet the traveller may journey over a vast extent of that country and meet with scarcely a single species; for during the greater part of the day they mount to high elevations and soar in great circles, seldom remaining constant in any locality. They prefer the neighbourhood of towns or along the highways, often congregating in flocks; and it is not uncommon to see different species together. We have seen them even in the centre of the Scinde deserts; in fact no situation is without its species, for with few exceptions they abound all over Asia.

I have devoted much attention to the question whether these birds discover their food by smell or sight; and after many practical observations I am convinced it is by sight alone they are enabled to find out their prey. In illustration of this fact, I may adduce the following as an occurrence familiar to every Himalayan sportsman. After a bear or other large animal is killed, the hunter soon finds himself surrounded by rapacious birds, where none were seen before; they are observed dashing down the glens, and sailing in circles around his quarry. Some sweep within a few yards of him. Others are soaring at higher elevations, and even at such vast altitudes that the huge Bearded Vulture appears only as a small speck in the deep blue heavens; but gradually it becomes more distinct as its wide gyrations increase. It may gather itself up and close its wings, or dash in one fell swoop hundreds of feet, and the

* Throughout the following paper I have given only the result of careful examination and experience. No species is named whose identity I have not confirmed; such as are doubtful will be left unnamed and a description given, taken shortly after death. The nomenclature followed is with little variation that of Blyth's catalogue.—A. L. A.

next minute is seen perched on the jutting rock beside him. Such, then, are the usual appearances observed immediately after the death of a large animal; and the hunter wonders whence all these big Vultures and Carrion Crows have come: but if, immediately after his noble Ibex has rolled down the crag, he directs his eyes heavenward, he will observe Carrion Crows and Vultures at various distances and elevations sailing leisurely about; and very probably the one nearest to him, observing the death of his quarry, instantly commences to descend; then one follows the other, until the valley resounds with the hoarse croakings of the Crows, and the air seems alive with them. It is surprising the numbers that are sometimes observed to congregate on these occasions; I have seen no less than sixty Vultures and Crows on and around the carcase of a bear.

1. *GYPÆTUS BARBATUS* (Linnæus).

Bearded Vulture.

“Greed” of the Cashmerees, but generally applied to all the species.

Among all the grandeur and beauty of the Himalayas I know few sights more attractive to the naturalist than to behold the Vultures and rapacious birds soaring over the vast ravines and around the tops of the mighty mountains in the clear blue sky of a July afternoon,—the setting sun casting his last rays on the distant snow-clad mountains, the quiet evening broken only by the cry of the eagle, the bleat of the goat, or the shrill pipe of the Black Partridge. There is to be seen the Bearded Vulture (the Indian, Bengal, and Egyptian species) and kites and eagles wheeling in vast circles around the summits of the towering mountains as if it were all in one medley; but more conspicuous than the others is seen the immense Bearded Vulture.

It frequents the Western Himalayas to very high elevations, and is found likewise on the Salt and Suliman Ranges of the Punjab. I have seen a solitary bird at Peshawur; but it is seldom seen on the plains of India, and when at all, close to the mountains. The Bearded Vulture does not strictly confine itself to live animals; for on the hill stations at daybreak, among the first camp-scavengers, it is seen sailing leisurely along the mountain-sides in search of offal and refuse. However, it would appear, circumstances change to a great degree the habits of many rapacious birds; and although this species is a foul feeder in camp, in the solitude of his native mountains he hunts with great boldness and intrepidity. The Brown Eagle (*Aquila navia*) of the Himalayas, in form perhaps the most typical of its family, I have seen frequently feeding on carrion and refuse. Yet, with all, the Lämmergeier is a noble-looking bird, either when feeding in camp or hunting for prey on the more distant mountains. When thus employed, he flies low, keeping within a few yards of the ground, and describes circles on the mountain-side until he has beaten it from top to bottom. The Bearded Vulture is easily distinguished on wing from any other species by the long sharp-pointed wings and tail. There are two varieties of plumage—that of the

young and old. The former has the head and neck black, with a tinge of sooty-black all over the body; the adult has the same parts rufous-white. The feathers on the legs are long and plume-like, and project much backwards, particularly obvious when the bird is feeding. There are few rapacious birds possessing greater powers of flight, although generally to be seen sailing quietly and slowly along the mountain-sides, flapping now and then his long wings when he wishes to mount higher. If suddenly frightened, or bullied by his common tormentors Govind Kites (*Milvus govinda*) or Indian Jackdaws (*Corvus splendens*), he will shoot like an arrow down the ravine, then rise up with an easy but very rapid flight. It is by no means a shy bird, and will often pass within a few yards of one when searching for food. The nest is always built among rocks and inaccessible places. On one of the lesser ranges near Simla I found its nest and two young on a cliff overhanging a steep ravine; a vast collection of bones of sheep and cattle was strewn around—the refuse of one of the European stations not many miles distant. The eye of the Lämmergeier, although much smaller than might be expected in such a large bird, is bright and keen; the sclerotic coat red, and iris white: the former is brown in the young bird until its second year. Bruce, the African traveller, mentions having killed one weighing 22 lbs.; but none I have shot weighed above 14 lbs. From the tip of the bill to the extremity of the tail the largest measured 3 feet 11 inches, and between the extremities of the wings 9 feet. In the stomach of one killed by me on the mountains of Cashmere I found several large bones, together with a hoof of an Ibex. Many tales are told by the natives of the Himalayas, of the boldness and strength of this species, that the ibex, young bears, sheep, and goats are often carried away. The Marmots (*Arctomys Tibetanus* et *Himalayanus*) constitute their favourite prey; and wherever they abound, Bearded Vultures are to be seen. Among the feathers of the neck and lower parts are secreted quantities of a rust-coloured powder like cinnamon. The use of this ingredient I have never been enabled to discover, unless it keeps the feathers dry when the bird is feeding on carrion.

2. GYPS INDICUS (Scopoli).

Indian Vulture.

The Indian Vulture is larger than the bearded species, and is probably the largest of the tribe found in Hindostan. It measures generally about $8\frac{1}{2}$ feet between the tips of the wings; length of body, including tail, $3\frac{1}{4}$ feet. The largest I ever shot, apparently a fine old male, was 8 feet 11 inches between the tips of the wings, and 4 feet from the beak to the extremity of the tail; weight 19 lbs. The species is common all over India, and is seen in the interior of the Himalayas; indeed it is seldom the sportsman can leave his dead quarry an hour before he finds these birds devouring it. In the course of a few hours I have seen the carcase of a bear devoured by these birds, assisted by Bearded Vultures and Carrion

Crows. The backbone was generally the only part of the beak visible after their repast; and so nicely cleaned was the vertebral column, that it might have been done by the scalpel of an anatomist. They are common camp-visitors, but by no means so bold as others of the family, preferring to feed in secluded places, while the Egyptian Vulture can be seen on almost every dunghill in India. It would appear they prefer the carcasses of the dog, sheep, or ox in a putrid state to any other sort of offal. In clear evenings, and particularly after a sumptuous repast, they may be seen soaring in circles at vast elevations, and at dusk congregate in flocks of from thirty to forty, frequently accompanied by Bengal and Pondicherry Vultures, all huddled together on a rock or decayed tree: the white heads of the two former distinguish them from the red of the Pondicherry Vultures. Fights sometimes ensue; but, from the tardy movements of the combatants, they are seldom severe or bloody. Along with the other Indian species, it hunts the shores of the Ganges in search of the dead bodies of Hindoos, and likewise follows the armies of India in the field; and when the roar of the cannon and clash of war have died away, they repair in hundreds to the scene, and glut on the dead bodies of the fallen.

3. *GYPs BENGALENSIS* (Gmelin).

Bengal Vulture.

Is widely distributed over Bengal and the Lower Himalayan Range, but does not appear to travel far into the interior of these mountains. It is at once distinguished on the wing from having the lower part of the back, and under surface of the wings, pure white; when the latter are closed, the white on the back is not visible. These marks are very distinctive, and sufficient to discover the bird at very high elevations. Its total length is about 3 feet; and between the tips of the wings it measures 7 feet 8 inches. It is one of the keenest-sighted of the Vulture tribe, and usually the first to discover a dead animal.

4. *OTOGYPS CALVUS* (Scopoli).

Vultur Pondicerianus, Latham.

Red-headed Vulture.

Is found in Bengal, the Deccan, and Lower Himalayan Range, but does not travel any distance into the interior of these mountains. This species is easily distinguished from the others by the red colour of the skin on the head and neck. In size it is less than the preceding. Total length about 2½ feet. Bill bluish-black, cere yellow, feet deep yellow.

5. *NEOPHRON PERCNOPTERUS* (Linnæus).

Egyptian Vulture.

With perhaps the exception of the Govind Kite (*Milvus govinda*, Sykes), this is the most abundant and generally distributed of the

Indian Raptores. It is found in Scinde, but not common. It is abundant in the Deccan, Bengal, Punjab and Valley of Cashmere, but does not travel far into the interior of the Himalayas. Its habits are strictly domestic, frequenting towns and camps, where it lives on almost every description of offal and putridity. Its flight is unsteady and slow; and when on the ground, it walks with head erect, lifting the legs high, much after the manner of crows. The Indian authorities fully appreciate the value of its services; for in many districts of Bengal there is a penalty for shooting this species and the Govind Kite. Egyptian Vultures regularly repair to the European barracks during meals, and may be seen feeding in hundreds on the ground, and the Govind Kites darting down and bearing away in their talons the bone which the Egyptian Vulture is busily cleaning, the Kite devouring the flesh as it sails away. The two species never quarrel, and may be seen often perched together. During the march, they accompany regiments for hundreds of miles; and regularly at daybreak, as the camp is being formed, these vultures may be seen in flocks approaching from the direction of the last encamping-ground. This remark applies likewise to Govind Kites and Indian Jackdaws (*Corvus splendens*).

The Egyptian Vulture is the smallest of its tribe found in India. The total length does not exceed 2 feet 2 inches, and the size is about that of the Raven. The iris is yellow*. The shades of plumage are consequent on age; and it appears the adult garb is not obtained until the third year.

Besides the species above mentioned, the *Vultur kolbii* may be reckoned as an occasional visitor on the interior range of the Western Himalayas; and as the Griffin Vulture has been shot in Persia, I see no reason why that species likewise may not be found on the more western ranges, Hindoo Koh, &c.

6. AQUILA CHRYSÆTOS, Linn.

Golden Eagle.

I shot a young bird (Ring-tailed Eagle) on the Chor Mountain, near Simla, with a Kalij Pheasant (*Lophophorus albo-cristatus*) in its talons. The species frequents the Western Himalayas, but is not common.

7. AQUILA BIFASCIATA (Gray).

Is common around Poonah, in the Deccan. I have seen them roosting on the tops of houses; they feed at times on carrion.

8. AQUILA NÆVIA (Gmel.).

Spotted Eagle.

Is plentiful on the Western Himalayas, and less common in the Punjab. Its flight is rapid and strong. With Kites it is often seen feeding on offal in the Hill Stations near Simla.

* Some authors state the iris to be brown; true as regards the young bird only.

9. ? *AQUILA MALAYENSIS*, Temminck.

Black Eagle.

In Rupshoo in Ladakh I saw an eagle about the size of the *A. chrysaetos* (colour black, but head and neck white, tail long and wedge-shaped), probably belonging to this species.

10. *HALIAETUS MACEI*, Temminck.

Mace's Eagle.

Met with all up the Indus and its branches; very common on the Jhelum in the Valley of Cashmere. Its favourite haunts are low level shores, where it is often seen perched on a rock or decayed trunk of a tree, intently watching for fish. I have seen it frequently feeding on offal and the remnants of sheep and goats slaughtered for the use of the regiment during a march through Scinde. There is much variety in regard to colour. The bird after two years has the head and neck of a dirty white, body and wings black, rump and tail white, the latter broadly tipped with black. Young birds of the first year have very little white on the tail; and the head and neck are rufous. Its cry is loud, and resembles the cackle of the domestic fowl. They are very abundant on the Jhelum river and lakes of Cashmere, and so tame that boats may approach within a few yards of them. The *iris* is light brown. In the month of December 1852, a pair built on a poplar tree in the vicinity of a marsh close to Rawul Pindee; and by the end of the following month the young were hatched. I frequently observed the parents hunting in a pond for fish and dead snipe killed by sportsmen.

11. *HALIASTUR INDUS*, Boddaert.

Common on the Indus. Has much the habits of the Govind Kite; feeds on refuse as well as fish. Does not seem to frequent the rivers of the Punjab, although very common in Scinde.

12. *MILVUS GOVINDA*, Sykes.

Govind Kite.

There is considerable variety in colour of plumage in this species; scarcely two specimens are exactly similar. I have shot Govind Kites so dark of plumage, that I could not discover the slightest difference between this bird and *M. ater* of Gmelin: I believe they are identical. Abundant all over Bombay, Bengal, and the lower range of the Western Himalayas.

One afternoon, when the steamer was drawn up by the bank of the Indus, I observed a native washerman close by eating his fowl and curry. He was busy devouring a wing, when down dropped a kite, and actually, by means of its talons, tore the wing from between his teeth, devouring the capture as it sailed away. A few weeks afterwards, while sailing up the Sutlej river in small country boats, we halted at noon on a wet and sandy beach, for the purpose of allowing our party time to cook their dinners. As the soldiers and women were returning from the cooking-station about 30 yards from the

boats, carrying their plates filled with beef and rice, a flock of kites assailed them, darting like so many arrows on the laden platters, and bearing away the contents: the sight created great mirth in those who had dined. One poor woman, from the clayey nature of the soil, was unable to extricate herself, and stood there with out-stretched arms, begging for assistance as each successive kite darted down on her plate, until they completely devoured her dinner. It is wonderful the unerring accuracy with which these birds dart on their food: as soon as a piece of flesh is thrown on the ground, down darts a kite and seizes it with his talons, devouring it as it sails away; and so daring and undaunted are they, that, in the case of the poor washerman, his wife was obliged to stand over him with a stick, which she waved over his head during the remainder of the meal.

The Kite's nest is built of twigs lined with wool or any soft substance. The eggs are white, with rust-coloured streaks on the larger end. They generally build near the native towns and villages, particularly on the chunar trees in the Valley of Cashmere. They commit great havoc among young poultry and tame pigeons, which they torment to death by chasing them, until, worn out, the pigeon falls to the ground, and is soon despatched by his relentless enemy.

13. *CIRCUS ÆRUGINOSUS* (Linnæus).

Moor Buzzard.

India. Common.

14. *CIRCUS SWAINSONII*, Smith.

Punjab; Scinde. Pretty common.

15. *CIRCUS MONTAGUI*, Vieillot.

Punjab and lower range of the Western Himalayas. Common.

16. *POLIORNIS TEESA* (Franklin).

Around Poonah in the Deccan pretty common; not seen in the Punjab or Western Himalayas.

17. *ELANUS MELANOPTERUS*, Daudin.

Scinde and Punjab. Favourite food, mice.

18. *CIRCAËTUS GALLICUS*, Gmelin.

Bombay, Bengal. Common in the Punjab, particularly in the north-west, near Rawul Pindee.

19. *FALCO PEREGRINUS*, Linnæus.

Used by the Mahrattas for hawking. Inhabits Scinde. I found a nest on a tree on the banks of the Indus below Ferozepore, containing two young. On dissecting a specimen shot in Scinde, I found large coils of a species of Round Worm of about the thickness of a packthread, and 8 to 12 inches in length. Although the abdominal cavity was infested with them, the bird appeared plump and in good condition.

20. *FALCO PEREGRINATOR* (Sundeval).

Shot one near Simla on the Western Himalayas.

21. *FALCO CHICQUERA*, Daudin.

Lower range of the Western Himalayas, and N.W. frontier of the Punjab.

22. *TINNUNCULUS ALAUDARIUS* (Brisson).

Falco tinnunculus, Linnæus.

Deccan, common; seen at dusk in almost all situations; preys chiefly on large insects, mice, and the Black-breasted Lark-finch (*Pyrrhalauda grisea*). Punjab, Lower Himalayas, and Cashmere, common.

23. *TINNUNCULUS CENCHRIS*, Frisch.

Falco tinnunculoides, Temminck.

Abundant in many districts on the lower Himalayan Ranges, and preys extensively on the Mountain Pipit.

24. *FALCO ESALON*, Gmelin.

N.W. frontier of the Punjab (Peshawur), during the cold months only.

25. *ACCIPITER NISUS*, Linnæus.

N.W. Himalayas, pretty common.

26. *ACCIPITER DUSSUMIERI* (Sykes).

Deccan, Scinde, Punjab, and Cashmere, pretty common; favourite prey, larks and pipits.

27. *MICRONISUS BADIUS* (Gmelin).

Punjab and Cashmere; seen frequently, but not so common as the last.

28. *ASTUR PALUMBARIUS* (Linn.).

Seen only in a domestic state. The ex-Ameers of Scinde had several very fine specimens at Poonah trained for hunting. Said to inhabit the Western Himalayas.

29. *BUBO BENGALENSIS*, Franklin.

Common in the northern Punjab and cultivated districts on the Lower Himalayas.

30. *ASIO BRACHYOTUS*, Gmelin.

Pretty common all over the Punjab and lower ranges of the W. Himalayas.

31. *KETUPA CEYLONENSIS* (Gmel.).

Western Himalayas, not common. Iris deep orange.

32. *ATHENE CUCULOIDES*, Vigors.

Lower Himalayan ranges, northern Punjab. Pretty common; killed one devouring a brown rat; the crop contained a mouse and beetles.

33. *ATHENE BRAMA*, Temminck.

Common in the Deccan, Scinde, Punjab, and W. Himalayas.

34. *ATHENE BRODIEI*, Burton.

I saw one specimen of this small species near Simla on the W. Himalayas. Not common.

35. *UPUPA EPOPS*, Linn.

India and on the Western Himalayas as far north as Chinese Tartary. I found it common in Ladakh. Often seen on trees. Its cry resembles the words *hoo hoo*. The *Dicrurus longicaudata* (A. Hay) is its frequent tormentor. On the fine glassy glades in the Valley of Cashmere the Hoopoe may be seen digging its long bill into the soft turf in quest of insects; and just as its labour is nearly done, down pounces the black Drongo Shrike (*Dicrurus*) to secure the fruits of its toil.

36. *HALCYON SMYRNENSIS* (Linnæus).

India, common.

37. *CERYLE RUDIS* (Linnæus).

India and Himalayas, common.

38. *ALCEDO BENGALENSIS* (Gmelin).

India and Lower Himalayan ranges. Very plentiful on the streams and lakes of Cashmere, and adding much to the beauty of the far-famed Shalimar gardens and the delightful scenes in that romantic land.

39. *CORACIAS INDICA*, Linnæus.

India, W. Himalayas, Cashmere; common. The *C. garrula* is said (Blyth's Cat. As. Soc. Mus. p. 51) to frequent the latter country; but this I think is very doubtful. The Indian Roller is everywhere abundant; they perch on the broad tops of the mango trees in the Deccan, and at dusk sport from tree to tree with a zigzag flight in quest of insects. Their cry is harsh and loud. The nest is often built in the thatch of houses or in chimneys.

40. *MEROPS APIASTER*, Linn.

Plentiful at certain seasons and in particular localities both in the Punjab and Western Himalayan ranges. May be seen in large flocks at Peshawur, on a fine afternoon in summer, sailing overhead, with that peculiar flight by which the family are so readily distinguished: it is usually after a shower of rain, when the White Ants take flight and the air is filled with these insects, that the Bee-cater

is seen sporting about and feeding sumptuously. The larger size and louder call-note distinguish this from other Indian species.

41. *MEROPS VIRIDIS*, Linnæus.

Indian Bee-eater.

Abundant all over India and the warmer parts of the W. Himalayas. It is frequently seen in large flocks sailing over pools or across desert sands in quest of insects. What are called varieties of this species are, I think, only immature birds before the first moult.

42. *CHLOROPSIS MALABARICUS* (Jardine).

A specimen of the above was procured from a collection made on the Eastern Himalayas near Nipal. Apparently not a native of the Western Himalayas.

43. *BRACHYPTERNUS AURANTIUS* (Linnæus).

Scinde and Lower Himalayas; pretty common. One specimen from the Himalayas had the feathers on the forehead black, edged with white; supposed to be a female or variety. Iris red.

44. *GECINUS SQUAMATUS* (Vigors).

A common Himalayan species; frequents dense oak and pine forests or jungles. Habits and call resemble the Green Woodpecker. Confined to the mountain-ranges.

45. *PICUS MAHARATTENSIS*, Lath.

Not uncommon at Poonah; occasionally in Scinde; not seen in the Punjab or Himalayas.

46. *PICUS HIMALAYANUS* (Jardine and Selby).

The most common and widely distributed Woodpecker in the East; found all over India, and in all wooded districts on the Western Himalayas.—Qu. Is *P. majoroides* (Hodg.), a distinct sp.?

47. WHITE-HEADED WOODPECKER.

A species seen on one occasion in a forest on the ranges around the Valley of Cashmere. About the size of the Lesser Woodpecker. Head, neck, and breast white; back blue; vent and under parts red.

48. *MEGALAIMA VIRENS* (Boddaert).

Frequents dense forests and jungles on the Western Himalayas, confined to the mountain-ranges; is often met with on the Cashmere mountains. Flight rapid, and like the true Woodpeckers; cry loud and harsh. Gizzard contained small seeds, no insects.

49. *MEGALAIMA INDICA* (Latham).

Pretty common at Poonah, in the Deccan; not seen on the Himalayas or in the Punjab.

50. *CUCULUS CANORUS*, Linnæus.

Deccan; at Poonah pretty common. Abundant from the lower ranges to the limits of forest on the Himalayas; commences to call in March and ceases in June. I saw them on the Himalayas in August and September, and was informed by natives that they remain all the year.

51. *EDOLIUS CUCKOO* *.

This bird is common in the Deccan and Western Himalayas, particularly in the Valley of Cashmere, where its loud note is heard in every brake, and resembles the word "coel" repeated frequently. The following is a description of one I shot at Poonah. Iris hazel; size of Blackbird; crested; crest and all upper surface of body black glossed with green; the tip of tail white; a bar of white across the wings; lower surface of body a dirty white; that on the throat and neck tinted blue; lower feathers of tail graduated, with white tips; feet black. No difference between sexes. Gizzard contained caterpillars.

52. *CENTROPUS RUFIPENNIS* (Illiger).

Malabar Crow of Europeans.

Common in the neighbourhood of Poonah, not seen in the Punjab or Himalayas; frequents plantations; flight easy and noiseless. Gizzard contained grasshoppers and large insects.

53. *CENTROPUS*, sp. ?

Hooked-billed Cuckoo.

These birds are common in low bushy places on the ranges near Simla, W. Himalaya; confined to the mountains; gregarious; notes rough; flutter from bush to bush like the Bush Thrushes; size about that of the Song Thrush; bill much curved and a bright scarlet, becoming fainter towards the tip; the lower parts of the body are ochreous brown, upper parts brown; wings short and rounded; tail long, broad, and fan-like; tarsus large and strong; feet rather small; versatile toes nearly equal to lateral; general cast of plumage lax, and points of feathers spinous, especially about the head and neck. Gizzard contained an entire lizard of about 3 inches in length, and several locusts, beetles, and large insects. Always secreting itself in thick coverts, is oftener heard than seen.

54. *CAPRIMULGUS*, sp. ?

A species very common on the lower ranges of the Himalayas. Size of the British species. Crown of head brown, minutely barred, the centre of a few feathers black; a white spot on the throat; the four outer wing-quills barred with white, the two outer quills of the tail broadly terminated with white; claw serrated.

55. *CAPRIMULGUS*, sp. ?

Seen rarely on the Western Himalayas; total length 10 inches :

* *Oxylophus melanoleucus* (Gmel.).—F.M.

specimen a female. Wing-quills and tail barred and spotted with rust-colour, the rust-coloured spots on the centre of the second and third wing-quills; throat-patch rufous, with a tinge of rufous all over the lower parts. Gizzard contained small seeds, earwigs, and grasshoppers.

56. *CYPSELUS MELBA* (Linnæus).

Sometimes seen in large flocks during the cold months in the Punjab; at all seasons on the W. Himalayas.

57. *CYPSELUS APUS* (Linnæus).

Abundant on the rocky banks of streams in Ladakh; Cashmere; very plentiful in the Punjab during the rainy months.

58. *CYPSELUS AFFINIS*, Gray.

Scinde and Punjab, pretty common. Builds under the eaves of houses: the nest is made of mud intermixed with wool or feathers.

59. *CORVUS CORAX*, Linnæus.

The Raven found in Ladakh is larger than the *C. corax*; but I saw no other difference, and am inclined to think it is only a variety*. The species is an inhabitant of the northern countries of India, commencing at Upper Scinde; it is found all over the Punjab at every season of the year, where they frequent camps and cantonments with Govind Kites and Egyptian Vultures. Mr. Blyth is wrong in saying the species does not frequent India, if by that he means the Punjab and Scinde (*vide* Cat. Mus. As. Soc. p. 89).

60. *CORVUS CULMINATUS*, Sykes.

Abundant in the Deccan, Scinde, but not in the Punjab. It is plentiful on the Western Himalayas, from the lower ranges northwards to Ladakh, Cashmere, &c.†

Note.—I think I have seen the *C. cornix* in the latter countries, and rather think it is a native of the more western Himalayan ranges, Hindoo Coosh, &c.‡

61. *CORVUS SPLENDENS*, Vieillot.

India universally, lower Himalayan Ranges, including Cashmere, but does not travel far into the interior; is frequently seen in the society of the *C. monedula* in the localities frequented by the latter.

62. *CORVUS FRUGILEGUS*, Linnæus.

A winter visitor in the N.W. frontier of the Punjab at Rawul Pindee, abundant; arrives about the beginning of September, and

* Is separated as *C. Tibetanus*, Hodgs. (*vide* Catal. Birds Mus. E.I.C. ii. p. 553).—F. M.

† Mr. Blyth states this to be the “Raven” of Europeans in India.” I never heard it so called (*vide* Cat. Mus. As. Soc. p. 89).—A. L. A.

‡ Specimens of *C. cornix* from Mesopotamia and Affghanistan are contained in the Museum of the East India Company.—F. M.

leaves before the end of March. Its migrations, I think, are westward. I never saw it in Cashmere in summer; unless a winter visitor, it is not found on the ranges eastward of Peshawur.

63. *CORVUS MONEDULA*, Linnæus.

Confined to certain places; nowhere more abundant than in the Valley of Cashmere. The imperial palace of His Highness Goulab Sing, with its crumbling walls, and the ruins in the Shalimar and Neshat gardens on the lake, offer excellent retreats for this species. During the breeding-seasons they congregate in vast numbers, and cover the adjacent country. I have seen them with rooks in the neighbourhood of Rawul Pindee and Peshawur, but only during the cold months; with this exception, it appears the species is confined to the locality above-mentioned.

64. *CORVUS CORONE*, Linn.

Lesser Carrion Crow.

Closely allied to the Indian Crow (*Corvus culminatus*), but very much smaller, and not larger than the Indian Jackdaw, is a black crow which frequents the lower Himalayan ranges from Peshawur to Simla. I can find no reference to this species anywhere. In habits it closely resembles the jackdaw; but its appearance is very like the Carrion Crow (*C. culminatus*). "Nostrils covered with bristles; colour metallic black like the rook; tail wedge-shaped; the feathers of the tail and secondary quills of the wings are *mucronated* at their tips. It feeds on offal and carrion, is gregarious; flight strong and rapid. Is often seen tormenting Govind Kites and birds much larger than itself."

65. *NUCIFRAGA HEMISPILA*, Vig.

Frequents the great forests on the W. range of the Himalayas, Cashmere pine forests, pretty common; and on the wooded ranges near Simla. A wandering bird, and not common anywhere. Generally seen at high elevations; they live among the topmost branches of the pine trees. Its harsh discordant cry is like that of the Magpie.

66. *FREGILUS GRACULUS* (Linnæus).

The Chough is often met with in the W. Himalayas, and during winter migrates with jackdaws to the N.W. frontier of the Punjab. Abounds on the Cashmere mountains, and may be seen in small flocks around the margin of melting snow, where the insects and roots it feeds on are obtained. Its wild excited flight, and still wilder cry, attract the sportsman's attention.

67. *PYRRHOCORAX ALPINUS*, Vieill.

Very distinct from the last, and frequents the high ranges in the interior of the Himalayas: pretty common in Ladakh. The food consists of insects and fruit; of the latter, mulberries constitute the chief portion.

68. *PICA BOTTANENSIS*, A. Delessert.*P. megaloptera*, Blyth.*P. Tibetana*, Hodgson.

Differs but little from the European bird. Its favourite habitat is among the dreary and desolate mountains of Ladakh; and it would appear it is found only in that country on the Western ranges. It is strange that a bird, whose near ally is so fond of fertile localities in Europe, should prefer the wastes of Little Tibet to the cultivated and wooded mountains of Cashmere: but such is the case; and the Magpie is the same crafty and familiar bird among his Tartar friends as with Englishmen.

69. *DENDROCITTA RUFA* (LeVaill.).

Scinde, Punjab, and lower Himalayan Ranges, pretty common. Its loud resonant cry is heard at a long distance. Its haunts are in retired wooded places; is oftener seen solitary than otherwise. Locusts, beetles, cockchaffers, and fruit constitute its favourite food.

70. *DENDROCITTA SINENSIS*, Latham.

Confined to the lower Himalayas. Abundant in all cultivated districts, frequenting the neighbourhood of villages; cry, loud and discordant: food, insects and fruit.

71. *PSILORHINUS OCCIPITALIS*, Blyth.*Pica erythrorhyncha*, Vigors.

Pretty common on the ranges around Simla and Kussowlee, and to the westward until replaced by the *P. flavirostris* of Blyth. The habits of this bird resemble the Magpie. The presence of a Cheetah or a bird of prey is often discovered by the chattering of these beautiful creatures.

72. *PSILORHINUS FLAVIROSTRIS*, Blyth.

On the mountains around the Valley of Cashmere, particularly on the banks of the Jhelum between the valley and the plains of India.

73. *GARRULUS GULARIS* (Gray).

A truly Himalayan bird, and is common in the lower ranges: cry, loud and harsh; habits assimilate to the European species.

74. *PARUS CINEREUS*, Vieillot.

India and Himalayas, abundant; replaces the Greater Tit of Europe in these countries. Solitary.

75. *PARUS XANTHOGENYS*, Vigors.

Confined to the Himalayas; not common; gregarious.

76. *PARUS MELANOLOPHUS*, Vigors.

Gregarious, and more common than the last, and more generally

distributed over the Himalayas. Confined to the mountains; seen often with the Golden-crested Wren (*Regulus cristatus*, Ray).

77. *PARUS* — ? *

The following Tit I shot in a flock of the last species near Simla, W. Himalayas. Confined to the mountains. Crested; length about 5 inches; iris brick-coloured; bill like Cole Tit and bluish black; forehead and below ear-coverts a dirty white; all upper parts, including wings and tail, leaden ash; breast, belly, and vent ochreous white; tail moderate and slightly forked; legs leaden-coloured, and claws the same. Specimen a male. I never saw this species afterwards.

78. *DORITES ERYTHROCEPHALUS*, Vigors.

Not uncommon around Murree on the Himalayas: confined to these regions; frequents pine forests, and often seen mixed up with *P. cinereus*, *melanophus*, or the next species.

79. *ÆGITHALUS FLAMMICEPS* (Burton).

W. Himalayas, not common. Seen frequently with the Tits, and in habits exactly similar.

80. *ACRIDOTHERES TRISTIS* (Linnæus).

India and W. Himalayas to the limits of cultivation.

81. *ACRIDOTHERES GINGINIANUS* (Latham).

Frequents the banks of the Indus in Scinde. Habits closely resembling those of the last species. Not seen in the Punjab or Himalayas.

82. *STURNUS VULGARIS*, Linnæus.

Abundant all over northern India, Cashmere, and Himalaya.

83. *STURNUS*, sp. ?

Very common in Cashmere, Scinde, and Punjab. Rather smaller than the Starling. Bill yellow; feathers of the body long and narrow, uniform metallic black shaded with green and purple, particularly on the neck and breast; rump-feathers thick, and obscurely tipped with white; tail rather short and forked; legs brown, claws strong and curved. Frequent in the plains of India, the jungles, and cattle pastures, often associating with the *Acrid. tristis*. They breed in Cashmere, and build their nests in the decayed chunar trees in the valley. Nest composed of dried grass, wool, and feathers. "This bird, if not identical, is very like *Sturnus unicolor*."—Blyth.

84. *STURNIA PAGODARUM* (Gmelin).

Common on the Cashmere mountains, not seen in the plains of

* Evidently *Parus dichrous*, Hodg., which has hitherto been found only in Nepal.—F. M.

India. Solitary in its habits ; is shy and timid ; cry, loud and harsh. Food, seeds or the buds of Coniferæ. Iris *white*.

85. PASTOR ROSEUS (Linnæus).

Very gregarious, and abundant during the harvest months in the Punjab, and destructive in barley fields ; whole districts have been devastated by this bird. Not seen on the Himalayas ; common around Poonah in the Deccan. It is seen often associating with *Acrid. tristis*.

86. PSARAGLOSSA SFILOPTERA (Vigors).

Not uncommon in the W. Himalayas ; frequents rice-fields or sides of mountain streams. Iris *white*. Shy and timid in habits.

87. PLOCEUS BAYA, Blyth.

Gregarious ; abundant in the Deccan, particularly near Poonah, but is less so in Upper Bengal and the Punjab.

88. MUNIA UNDULATA (Latham).

89. MUNIA MALABARICA (Linnæus).

90. ESTRElda AMANDAVA (Linnæus).

Generally distributed over India. The *undulata* and *amandava* are perhaps the most common ; they live in little societies, are tame and easily caught ; they are the common cage-birds of India.

91. PASSER INDICUS (Jard. & Selby).

The House Sparrow is more widely distributed than any species found in Hindostan : it is found all over India, and northward even on the steppes of Chinese Tartary. In every village and town of Hindostan it swarms in countless thousands, and is the same dirty noisome bird as we find in the streets of London. During summer evenings in Cashmere they assemble in vast flocks on the chunar trees, accompanied by myriads of Jackdaws and Maina birds (*Acridotheres tristis*) ; their rough *calls*, mixed with the chirpings of the sparrows, are anything but pleasant. In the wild and barren Ladakh the Sparrow lives and dies under the roofs of the rude inhabitants of that desolate and dreary land. I recollect, when traveling in that country, we came to an assemblage of Tartar huts after a long and fatiguing march of twenty miles ; not a symptom of animated nature was visible : long we waited at the doorway of a miserable little hut ; but no natives made their appearance : at last a chirp was heard, and a Sparrow flew out of the hovel : this little fact was convincing ; for the Sparrow loves man—"The place is inhabited ;" and so it was. A short time afterwards a flock of goats and sheep were seen winding down the glen ; and we were soon surrounded by crowds of wondering Tartars.

92. PASSER CINNAMOMEUS, Gould.

On the lower and middle regions of the W. Himalayas. Fre-
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quents the wooded copses, and is common around the hamlets in the Valley of Cashmere. More shy and wary than the last, with which it does not associate: its cry is very different.

93. *MONTIFRINGILLA NEMORICOLA* (Hodgson).

Strictly a Himalayan bird; is plentiful at high elevations at all seasons, and feeds around the margin of melting snow. Generally seen in large flocks, flitting from place to place like Snow Buntings. As winter advances, they migrate southwards, and are found on the lower ranges. The chirp is like the Snow Flake (Nanee), and flight exactly similar.

94. *MONTIFRINGILLA HÆMATOPYGIA*, Gould, P. Z. S. 1851, p. 115.

Found in Ladakh, common on the mountains around the Choumeraree Lake; I did not see it on the ranges southward. Its flight is strong and rapid. Feeds on the seeds of a species of wormwood, which grows plentifully around the lake.

95. *MONTIFRINGILLA ADAMSI*, Moore, MS.*

Mountain Finch.

Common on the bare and barren mountains of Ladakh and Little Tibet, and feeds on the seeds of the few plants found in these desolate and dreary-looking mountains. Its cry is like that of a Lark; and its habits on the ground are very similar. The nest is composed of grass, and generally placed in the long dykes built by the Tartars over their dead, so frequently to be seen in that country. General texture of the plumage lax and soft. Size of the Chaffinch. Iris hazel. Bill perfectly conic, the commissures considerably sinuated and lobed in the middle. Nostrils basal. Head and back greyish-ashy; three first wing-quills nearly equal; quills black, having the secondary quills broadly tipped with white. Wing-coverts white, tipped with black; last feather of the wing-quills like the head and back. Tail moderate and rounded, having the upper feathers black, and the under white tipped with black. Lower parts greyish-white, with an obscure black mark on the neck. Lower extremities black; hind toe and claw much longer than the lateral toes, which are about equal.

96. *CARPODACUS ERYTHRINUS* (Pallas).

Scinde, not common; lower ranges of the Himalayas; Cashmere; cultivated districts of Ladakh. Pretty common; seen generally solitary or in small flocks. Habits resemble Linnets.

Note.—On the Peer Pinjal ranges of Cashmere I saw a species of Finch larger than the above, with the red on the body more brilliant, particularly on the throat and breast. I was inclined to think it was the *Carp. rhodochrous*, Gould.

* Sir William Jardine considers this a new species allied to *M. gebleri*.

97. *CARDUELIS CANICEPS*, Vigors.

Strictly Himalayan, and inhabits all the western ranges from the lower mountains to the limits of cultivation, but only a winter visitor in the ranges next the plains of India. In Cashmere common. Its song is sweet, and exactly similar to its European congener.

98. *HESPERIPHONA ICTERIOIDES* (Vigors).

Common in the dense pine forests of Cashmere. Feeds on cones, fruits, and tender shoots of trees. Generally seen in flocks, but oftener in pairs. Flight rapid and strong. The loud wailing cry of this bird is frequently the only sound heard to break the stillness of a Himalayan forest.

99. *LINOTA* — ?

Abundant in Ladakh only. In habits and appearance bears a likeness to the Grey Linnet*; gregarious, and frequently seen with the *Montifringilla hæmatopygia* (Gould). Total length 5½ inches. Bill livid; eye small; iris hazel, size of Redpole; upper plumage greyish brown, with darker streaks of brown; wing-quills black, margined with white; wing-coverts light brown; tail forked, with edges of quills streaked with brown or white; legs nearly black, lower parts dirty greyish white.

100. *EMBERIZA STEWARTII*, Blyth.

Emberiza caniceps, Gould, Birds of Asia, 1854.

Very common on the ranges around Cashmere, but not seen eastward: frequents fields, and in its habits exactly similar to the Yellow Bunting: confined to the mountains.

101. *EUSPIZA LUTEOLA* (Latham).

Very common during the harvest season on the Punjab, and gregarious. Its song is sweet and melodious, and somewhat resembles that of the Goldfinch.

102. *EUSPIZA LATHAMI* (Gray).

A solitary bird, scarcely ever seen otherwise: common in the Punjab and lower Himalayas.

103. *EUSPIZA SIMILLIMA*, Blyth.

Gregarious and common around Poonah in the Deccan. Not seen in the Punjab or Himalayas.

104. *PYRRHULA ERYTHROCEPHALA*, Vigors.

Confined to the Himalaya ranges. Never seen in the plains of India. By no means common anywhere. Its habits exactly similar to the *P. vulgaris*; but its call-note is not so loud. Frequents dense jungle.

* Mr. Gould names my specimen (a young bird), of *L. brevirostris*. Sir William Jardine is disposed to consider it identical with *L. montium*, Linn. (see Moore, P. Z. S. 1855, p. 217).

105. *PYRRHULA AURANTIA*, Gould, P. Z. S. 1858, p. 222 ; Birds of Asia, 1858, pt. x.

Orange-coloured Bullfinch.

Seen only on the Cashmere Ranges ; usually in small flocks in lonely places. Call-note more like the chirp of the Greenfinch than the clear call of the *P. vulgaris*.

Male.—Bill black. Total length 5 inches. A black band surrounds base of bill, eyes and chin. Crown of head, neck, breast, belly, back, and edges of wing-coverts a rich orange. Tail, wing-coverts, except their edges, glossy crow-black. Rump pure white ; the colour of the back is less rich than on the other parts, and fades towards the vent, which is white. Legs light brown. Iris black.

Female.—Has the black circle round the bill. Head and neck ash-coloured, like the female of *vulgaris*. Back slightly tinged with orange on an ashy base ; the tips of the wing-coverts the same. Lower parts like the male, but much less brilliant, and approaching to olive.

106. *PYRRHULAUDA GRISEA* (Scopoli).

Poonah, Deccan, very common ; less so in the Punjab ; not seen in Scinde.

107. *FRINGILLA RUBRIFRONS* (Gould) *.

Very common in all the wastes and valleys of Ladakh. Its favourite food in summer is the seeds of a species of *Artemisia*. Often seen in the Punjab towns as a cage-bird imported from Ladakh and Afghanistan.

108. *MELANOCORYPHA TARTARICA* ?, Pallas†.

A common cage-bird in Cashmere and the northern towns of the Punjab. I have not seen the bird in a wild state ; but natives say it is brought from Afghanistan. It is nearly the size of the Redwing. Bill strong and thick. Colour of plumage like the Skylark, except a broad black band across the chest. Its song is sweet and melodious, and is more powerful and as much varied as the *Al. arvensis*.

109. *ALAUDA ARVENSIS* ?, Linnæus.

A winter visitor on the lowest ranges of the Western Himalayas ; at all seasons in Cashmere and cultivated districts of the interior. I think it identical with the British species ; however, it does not appear to mount so high or remain so long on the wing. Perhaps found in the Punjab during winter.

Description.—Length 6 inches. Upper parts lark-brown, spotted deeply with black ; white streak over eyes ; throat dirty white ;

* ? *Melopenia pusilla* (Pallas). Syn. *Fringilla rubrifrons*, Hay (see Catal. B. Mus. E.I.C. ii. p. 494. no. 754).—F. M.

† This is *Melanocorypha torquata*, Blyth (see Catal. B. Mus. E.I.C. ii. p. 470). The *Mel. tartarica* of Pallas inhabits Northern Asia and North-eastern Europe.—F. M.

breast obscurely spotted with black. Lower parts dirty white. Inner surface of wings French white; first quill exceedingly minute; second nearly as long as the third and fourth, which are equal, and the longest secondary quills emarginate. Tail forked, outer feathers having their margins white. Legs light brown. It follows up the valleys leading from Cashmere; and wherever cultivation extends and luxuriant pasture abounds, there the Lark is seen. I found it at Dras in Ladakh, but afterwards lost sight of it owing to the barren state of the country northwards.

110. *GALERIDA CHENDOOLA* (Franklin).

This is the most common species of Larks in India, and is as much a bird of the desert as of the field. Scinde, cultivated or in the desert; parts of Punjab, very common, gregarious during winter.

111. *SAND LARK*.

Abundant on the banks of the Indus and Northern Scinde. Size of the Grey Linnet. Colour a sandy brown. Bill short and nearly conical; hind claw long and curved; tail moderate and slightly forked, the upper feathers of which are black; otherwise similarly marked to the last species.

Note.—On the lower Himalayan Range I saw on one occasion a species of Lark or Titlark of the size of the *Alauda arvensis*: colour of body was a sandy brown; but very distinguishing marks were a black throat, and streak round the eyes of the same colour. The female was not so distinctly marked.

112. *ANTHUS RUFULUS*, Vieillot.

A common and generally-distributed species all over India and the cultivated districts of the Western Himalayas.

113. *ANTHUS TRIVIALIS* (Linnæus).

Very common on the lower Himalayan Range.

114. *ANTHUS AGILIS*, Sykes.

Common around Poonah in the Deccan; Northern Punjab. Gregarious during winter in the latter country. Less abundant on the lower Himalayan Range.

115. *ANTHUS* —?

Frequents the furze country in Ladakh. Its call-note resembles the Siskin. Size of a Black Redstart. Iris hazel. Bill notched, broad at the base and thin; upper mandible overlaps the lower; nostrils slit, culmen almost straight. Upper parts brown, striated like the *Anthus trivialis*; throat and neck mouse-brown; a broad rufous band across the breast; belly and lower parts dirty white, mixed with the brown of the back; legs light brown; tarsus slender; feet well-formed; lateral toes almost equal; hind claw well-developed.

Except the band across the breast, this bird is very like the common Himalayan Pipit, *A. trivialis*. Builds a nest like the Yellow Bunting; eggs similar.

116. *MOTACILLA MADERASPATANA*, Briss.

Poonah, rare, and not seen elsewhere.

117. *MOTACILLA DUKHUNENSIS*, Sykes.

Very common at Poonah and in Scinde, less so in the North-west Provinces; not seen at Peshawur.

118. *MOTACILLA LUZONIENSIS* (Scopoli).

Punjab (Peshawur), very common during the winter months. Not seen in the Deccan or elsewhere.

119. *MOTACILLA BOARULA*, Linnæus.

Only met with in Cashmere and its surrounding mountains; common.

120. *BUDYTES CITREOLA* (Linnæus).

Deccan, Scinde, Punjab, common.

121*. *BUDYTES VIRIDIS* (Scopoli).

India, Punjab, very common, often gregarious.

122*. *BUDYTES MELANOCEPHALA*, Sykes.

Very common in lower Scinde during the cold months; not seen in the Punjab or Himalayas.

123. *MALACOCERCUS MALCOLMI* (Sykes).

Common at Poonah; Scinde (banks of Indus); not Punjab or Himalayas.

124. *MALACOCERCUS CAUDATUS* (Duméril).

Scinde and Punjab, common.

125. ? *TROCHALOPTERON* —.

Bush Thrush ??

Length $3\frac{1}{2}$ inches; tail 5 inches. Bill black, curved, with two bristles diverging backwards from the gape; feathers of forehead stiff; upper parts brown; lower parts dirty-white, more or less tinged with brown; wings short, rounded; legs long; feet large; tail worn at the tips and much graduated.

Habits. Frequents bushy places, and, like its genus, seen in small

* "These are identical; the birds acquiring blue-grey feathers on the head at the vernal moult, which change afterwards to black. The name *B. viridis* must be retained for the species." (Blyth, Cat. Mus. As. Soc. Calc. Appendix, p. 325.)
—T. J. M.

flocks ; flies feebly, and emits a tittering call. This species is common on the Himalayan Range, near Simla.

126. *PRINIA* OF *DRYMOICA*.

This little bird is common in the Deccan and Scinde ; frequents hedges and fields of grain : an active, restless creature, continually jerking its tail up and down when on the move. Searches for insects among the dense foliage of mango and other trees. Call, loud and very like the sound produced by the rasping of a file.

127. ? *PRINIA* —, sp.

Size of Long-tailed Tit. Bill short and black ; legs long and slender ; tail graduated and long, first quill minute, second nearly as long as the third. In appearance and plumage resembles in some degree the Willow Wren ; the upper parts are exactly similar ; the tail is soft and readily moveable, tipped with white, conspicuous when the bird is on the wing, or when jerking the member ; cheeks, throat, and breast whitish-yellow ; belly and vent white, tinged with yellow ; tarsus and feet yellow. Common in the fields around Poonah, Deccan.

128. *PRINIA SOCIALIS*, Sykes.

General characters the same as the last. Frequents like situations. Total length about $4\frac{1}{2}$ inches. Bill slender, black ; nostrils slit-like ; head, back part of neck, and back leaden-blue ; wing-feathers brown, their outer margins tinged with reddish-brown ; tail brown, having the tips of the longest feathers barred with obscure black ; throat, cheeks, breast, belly, shoulders, and vent ochreous-white, the yellow tinge being more distinct on the sides of the belly and the legs. Frequents fields of Badgeree in the Deccan, where it may be seen often perched on a stalk of grain, emitting its loud rasping call, which might be mistaken easily for that of a much larger bird. It is as common as the last species. Not seen in Scinde.

129. ? *PHYLLOSCOPUS* — ?

Very closely allied to the last ; in habits and general appearance the same. Generally seen in pairs, or three at a time. Common in Scinde and Punjab, frequenting gardens and fields of grain. Same size as last. Bill weak and narrow, with a few diverging bristles at the base, colour brown ; head, neck, and back olive-brown ; wings short and rounded and margined with rufous ; tail brown, beneath paler ; an obscure white streak passes over the eye ; throat and lower parts white, with an ochreous tinge on the belly and vent ; legs pale. Description taken from a male.

130. *PRINIA HODGSONI* (Blyth).

Punjab and lower Himalayas, common. Frequents bushes and hedges by waysides.

131. *ORTHOTOMUS LONGICAUDA*, Gmelin.

Frequents the mango and other trees in the Deccan; flits among the dense foliage in quest of insects. Cry loud and rasping. I have frequently mistaken its call for that of the Common Mina (*Acridotheres tristis*); so loud and powerful is it: unless by its cry, it is not easily discovered; for its motions are noiseless.

132. ? *PRINIA* —, sp.

Bill straight; nostrils covered with a delicate membrane. Size of last species. Plumage lax, upper parts olive-brown, assuming more of a rufous colour on the head and forehead; a small black spot on each side of the bill close to the eye; throat black; rest of lower parts ochreous; tail moderate, much worn; wings short and rounded; lower extremities rather large; a broad pad at the root of hind toe; iris red. Frequents the apricot and other trees on the lower Himalayan Range; not common or seen elsewhere. Its habits are much like those of the *Prinia*.

133. *PTEROCYCLUS LINEATUS* (Vigors).

Syn. *Cinclosoma setifer*, Hodgson.

Frequents bushy places; very tame, and allows one to approach within a few yards; flies from bush to bush with a fluttering feeble flight. Pretty common on the lower Himalayan Range.

134. *TROCHALOPTERON RUFOGULARE* (Hodgson).

Frequents like situations with the last. Common on the lower Himalayan Range, and around the vale of Cashmere.

135. *PYCTORHIS SINENSIS* (Gmelin).

Syn. *Timalia hypoleuca*, Frankl.

Tamarisk jungles of Scinde, common. Gregarious; flight broken and irregular; flits from bush to bush.

136. *LANIUS LAHTORA*, Sykes.

Bombay, Scinde, Punjab, Lower Himalayas: common, but more abundant in the first three countries.

137. *LANIUS SUPERCILIOSUS*, Linnæus.

Bombay, Scinde and Punjab, but nowhere common, and generally solitary. The differences of plumage of sexes are very great.

138. *LANIUS HARDWICKII*, Vigors.

Very common at Poonah; less so in Scinde. I never saw it on the Western Himalayas. The rufous of the lower parts of the male becomes very brilliant during the breeding-season.

139. *LANIUS CANICEPS*, Blyth.

Deccan, Scinde, Punjab, and lower Himalayas, common.

140. *LANIUS TEPHRONOTUS*, Vigors.

Very common in the Valley of Cashmere; not seen elsewhere. Very like the last species.

141. *LANIUS KEROUOLA* (Gray)*.

Seen only on the Western Himalayas, where it is not common. Frequents gardens, and hunts around the houses of the natives.

142. *PITTA TRIOSTEGUS*, Sparmann.

Island of Elephanta, Bombay, and occasionally in the N.W. provinces of India.

143. *HYDROBATA CINCLUS* (Linnæus).

Vale of Cashmere and streams in Ladakh: seen only in these situations; does not frequent the lesser ranges.

144. *HYDROBATA ASIATICA*, Swainson.

Cinclus Pallasii, apud Gould.

Common on the streams in the lower and middle regions of the Western Himalayas, and likewise in Ladakh. Both this and the last species are truly Himalayan birds.

145. *TROGLODYTES NIPALENSIS*, Hodgson.

Among stony places, in glens, and around the margins of avalanches on the Cashmere Ranges; common.

146. *ENICURUS MACULATUS*, Vigors.

Common on the streams of the lower and middle Himalayas.

147. *ENICURUS SCOULERI*, Vigors.

Lower Himalayan Ranges; Cashmere. Its habits bear a close resemblance to the last. It sports around mountain-streams and water-falls in search of insects. Both species are very active in their habits.

148. *MYIOPHONUS TEMMINCKI*, Vigors.

Pretty common on the streams of the lower Himalayas; frequents shady places. Note musical, slow and measured, like the Blackbird, but softer. Its food consists of insects and larvæ. The nest is built like the Blackbird's, and generally placed on the bare shelf of a rock overhanging a mountain-torrent.

149. *TURDUS VISCIVORUS*, Linnæus.

Lower and middle regions of Western Himalayas, common; forests of Cashmere, plentiful.

* This is *Tephrodornis pondiceriana* (Gmel.). See Catal. Birds, Mus. E.I.C. i. p. 169.—F. M.

150. *TURDUS UNICOLOR*, Gould, P. Z. S. 1837, p. 136.

Turdus schistaceus, F. Moore, MS.

Cashmere Song Thrush (mihi).

Hitherto rare in collections. Seems confined to Cashmere and the surrounding ranges; very plentiful in the valley; and in habits bears a striking resemblance to the Mavis. Its song is composed of few notes, little varied, and often repeated. They build in the pine and apple trees. There is some considerable variety in the colour of the plumage, some being darker than others; and the sexes differ in the male not having any indication of spots on the neck and throat. Description of a perfect female as follows:—Size of Redwing. Bill pale yellow, margins of eyelids the same; upper parts leaden-ash, quills dusky; throat obscurely spotted with black; breast and lower parts ashy-white. Lower extremities pale yellow; tail dusky; inner surface of wings ochreous-yellow.

151. *TURDUS ATROGULARIS*, Natterer.

Common all over the lower Himalayan Ranges during the winter months; seeks the dense forests of the middle regions during summer, where it breeds.

152. *TURDUS*?

Common in gardens and ploughed fields in the Valley of Peshawur during the cold months. Mr. Gould considers my specimen a variety of *T. atrogularis* (Natt.); this I think is doubtful; I believe it to be a distinct species. Sir William Jardine says, "I have examined your thrush; unless a small or local variety of *T. atrogularis*, it is distinct." I have seen *T. atrogularis* in the above locality, but never associating with the other. Total length 9 inches. Upper parts olive-brown; throat and front of neck dirty-white; the sides of the neck and breast are thickly spotted with olive-brown; belly and lower parts dirty-white; legs light brown.

153. *MERULA VULGARIS*, Ray.

A common cage-bird in the towns of the Punjab; said to be imported from Afghanistan. Not a native of the Western Himalayas; as far westward as Peshawur, but probably found on the Hindoo Coosh Chain?

154. *PALZORNIS ALEXANDRI* (Linnæus).

Subhimalayan Ranges and country between Lahore and the Sutlej; pretty common, but not nearly so common as the next.

155. *PALZORNIS TORQUATUS* (Brisson).

India and lower Himalayas, very common. I have seen it pillage the nests of the Sand Martin. Its flight is exceedingly rapid; they occasionally tumble when on the wing, like the Tumbler Pigeon.

156. *PALÆORNIS SCHISTICEPS*, Hodgson.

In habits resembles the last. Its favourite food is seeds of wheat, apricots, and pomegranates; very noisy and gregarious. Confined to the lower ranges of the Western Himalayas.

157. *PALÆORNIS CYANOCEPHALUS* (Linnæus).

Island of Elephanta, Bombay, common; Subhimalayas, very common. Nest like that of the Wood Pigeon; eggs two, white. The female has no red spot on the carpus; and the head and neck are slate-coloured. These last three species may be seen frequently in flocks and mixed up with one another. On wing it is difficult to distinguish the species; but the tail furnishes a ready key: the *schisticeps* has the tip yellow, *cycanocephalus* white, and *torquatus* uniform green.

158. *PETROCINCLA CYANEA* (Linn.).

India and Western Himalayas, Ladakh, and Chinese Tartary; solitary in its habits, shy. I never heard it utter the simplest note or song. There is great diversity of plumage in the sexes. Frequents dreary wastes and rocky places; often seen among the dykes and cairns raised by the natives of Ladakh for religious purposes. Food, insects.

159. *THAMNOBIA FULICATA* (Linn.).

Plentiful in the Deccan; pretty common on the Punjab and lower Himalayan Range. The habits and haunts of this little warbler are very similar to the English Redbreast. Its nest is built in banks; the young are a uniform light brown until the first moult.

160. *COPSYCHUS SAULARIS* (Linnæus).

Common around Poonah in the Deccan, frequenting groves and orchards; pretty common on the Western Himalayas. Its song is loud, sweet, and melodious. Habits solitary.

161. *SAXICOLA PICATA*, Blyth.

Common in Scinde, frequenting gardens; seen frequently in the Punjab, but not on the Western Himalayas.

Note.—I saw on two occasions a species of *Saxicola* in the barren country of Ladakh. About the size of the Winchat; the upper parts were a dark blue; breast black; belly and lower parts white. The species is not uncommon on the banks of the Dras River.

162. *SAXICOLA ATROGULARIS*, Blyth.

Common in Scinde and the Punjab, frequenting the arid plains of these countries; not uncommon in the Valley of Cashmere. Its favourite food is a sort of white worm, abundant in dry sandy places.

163. *CYANECULA SUECICA* (Linnæus).

Punjab; around Peshawur: common. This pretty little warbler is common in the mustard fields of Scinde.

164. *RUTICILLA ERYTHROGASTRA**, Gûldat.

Seen only in Ladakh; I scarcely think it is a native of any part of Hindostan. Its favourite haunts are in fields, or by the sides of mountain streams; common near Leh.

165. *RUTICILLA INDICA*, Blyth.

Deccan; Scinde; not observed in the Punjab or on the Himalayan Ranges bordering the plains; pretty common in the Valley of Cashmere, and most plentiful in the barren country of Ladakh. As the bird is subject to considerable variety, I am inclined to think *R. phœnicuroides*, Moore (P. Z. S. 1854), is only a variety.

166. *RUTICILLA FULIGINOSA* (Vigors).

Common on the mountain streams on the lesser Himalayan Range and around the Vale of Cashmere; generally seen with the next species.

167. *RUTICILLA LEUCOCEPHALA* (Vigors).

Confined to the Himalayan Mountains. It delights to sport after insects by the side of the mountain torrent.

168. *CALLIOPE CYANA* (Hodgson).

Seen only on the ranges around the Valley of Cashmere; not common. Its habits greatly resemble the Redbreast. Frequents woods and forests.

169. *CALLIOPE PECTORALIS*, Gould.

Frequents high elevations, among rocks and precipices. Pretty common on the Pir Pinjal Ranges of Cashmere; not seen elsewhere.

170. *PRATINCOLA INDICA*, Blyth.

India and Western Himalayas, common.

171. *ERYTHROSTERNA LEUCURA* (Gmelin).

In appearance and habits bears a very close resemblance to the British Robin. I have not heard it sing; its call-note is Robin-like, "*creek creek*." Pretty common in the jungles of the Salt Mountains of the Punjab and lower Himalayan Ranges.

172. *NILTAVA SUNDARA*, Hodgson.

Not uncommon in the jungles of the lower Himalayan Ranges. Its habits greatly resemble the last species. Song composed of one loud and simple note, frequently repeated.

* The female of which is *R. Vigorsii*, Moore, P. Z. S. 1854, Aves, pl. 60.—F. M.

173. *STOPAROLA MELANOPS* (Vigors).

Generally seen single ; common on the lower Himalayan Ranges.

174. *HEMICHELIDON FULIGINOSA*, Hodgson.

Has much the same habits as the true Flycatcher ; frequenting woods and forests, it sports from branch to branch after insects. Not uncommon in the forests near Simla.

Note.—Closely allied to the above, both in appearance and habits, is a species I found pretty common among the tall poplar and chunar trees in the Valley of Cashmere. Total length $4\frac{1}{2}$ inches. Bill triangular, half the under mandible is a light yellow ; nostrils oval ; tips of bill slightly bent downwards ; eyes large, black, a faint white ring round the eye. Upper parts dark olive-brown ; tail moderate and slightly forked, first quill spurious, second and third longest. Lower parts lighter-coloured than the back, and on the neck and belly mixed with white. Legs short and black ; claws fully curved ; inner toe slightly shorter than the outer ; wings brown, with inner surfaces a faint rufous colour, giving the wings an appearance of transparency when the bird is flying. They are common in the valley, frequenting the tops of lofty trees, where they hunt after the manner of the true Flycatcher. Their favourite food is a white insect which swarms around the tops of the chunar and other trees. Their note is a loud chirp, like that of the Spotted Flycatcher. The description was taken from a male.*

175. *ACROCEPHALUS ARUNDINACEUS* (Linn.).

Abundant on the lakes and fens in the Valley of Cashmere.

176. *PHYLLOSCOPUS NITIDUS*, Blyth.

Deccan and Scinde, common ; frequents woods and groves. Its note is low, sweet, and varied.

177. *PHYLLOSCOPUS TROCHILUS* (Linn.).

Deccan, Scinde, and lower Himalayan Ranges, common.

178. *PHYLLOSCOPUS TRISTIS*, Blyth.

Deccan, Scinde, and N.W. Bengal, common.

179. *REGULUS CRISTATUS*, Ray.

Forests of the middle regions of the Western Himalayas and around Cashmere ; pretty common. Seen generally with the *Parus melanolophus*.

180. *SYLVIA CURRUCA* (Gmelin).

Furze and bushy places in the Valley of Cashmere, common.

* I am inclined to consider this a young bird of *H. fuliginosa*. There is no material difference, except in being spotted—the case with the young of Flycatchers in general.—A. L. A.

181. *TICHODROMA MURARIA* (Linnæus).

Punjab, frequenting the ravines and broken-up country north of the Jhelum; common in the Valley of Cashmere, and on the lower Himalayan Ranges. The sexes are alike in colour of plumage.

182. *SITTA HIMALAYANA*, Jardine & Selby.

Lower and middle regions of the Western Himalayas, pretty common.

183. *PERICROCOTUS FLAMMEUS* (Forster).

N.W. Punjab, Western Himalayas, Cashmere; common, gregarious. Flocks of one or the other sex are often seen; and generally more females are observed than males, the ratio about three of the former to one of the latter. The call-note resembles that of the Linnet.

184. *PERICROCOTUS PEREGRINUS* (Linnæus).

Common in the gardens and orchards around Poonah in the Decan; not seen on the Himalayas. They are generally observed in small flocks.

185. *HIRUNDO FILIFERA*, Stephens.

Common in the Deccan, not seen in Scinde; not common on the the lower Himalayan Ranges; occasionally seen in the Valley of Cashmere.

186. *HIRUNDO RUSTICA*, Linnæus.

Vale of Cashmere and lower ranges westward of the Jhelum river. Migrates to the Punjab during the winter months, but breeds and spends the summer in the mountains. A specimen compared with an English bird, and found identical.

187. *HIRUNDO DAURICA*, Linnæus.

Punjab and Himalayas, common; migrates during the winter to the former locality. Breeds among high rocks; the nest is oblong, and composed of mud and feathers intermixed; has generally two or more openings.

188. *CHELIDON CASHMIRENSIS*, Gould, P. Z. S. 1858, p. 356.

Common on the rocky banks of the rivers in Ladakh and Cashmere during the summer; migrates during the winter (perhaps) to the Punjab and India.

"Considerably smaller than *C. urbica*, but of precisely the same form and colour, except that the axillaries and under part of the shoulder are dark brown instead of greyish-white; the feathered tarsi occur in both species; crown of the head, back, and shoulders black, with steel-blue reflexions; tail brownish-black; throat, under surface, and rump white, stained with brown on the flanks. Total length $4\frac{4}{5}$ inches; wing $3\frac{1}{2}$; tail 2; tarsi $\frac{7}{8}$."

189. *COTYLE RIPARIA*, Linnæus.

Common on the Indus and rivers of the Punjab.

190. *COTYLE* — ?

Punjab, particularly on the lakes near the Salt Range ; often seen associating with *Hirundo flifera* and *H. daurica*.

Sir William Jardine says, "Your bird is not *C. sinensis* (Gray). I have authentic specimens of the latter ; they differ in size : *sinensis* is larger ; and the rump, instead of being pale, is uniform with the colouring of the back. Total length only $4\frac{1}{2}$ inches. Iris hazel, all the upper parts uniform brownish black ; wings as long as the tail ; tail moderate and nearly even ; throat dirty white ; an irregular brownish-black band across the breast ; belly and vent white ; tail brownish black ; tarsus almost naked, with only a few downy feathers posteriorly ; colour of tarsus black."

191. *DICRURUS LONGICAUDATUS*, A. Hay.

India and wooded districts of the W. Himalayas, common. Builds on trees ; the nest is elegantly built, and resembles that of the Chaffinch in size and construction ; the eggs are nearly as large as a Blackbird's, and white, with light-brown spots. Iris red.

Note.—Another species or variety, I once saw (and killed the individual) at Poonah, Deccan, in size resembled the above, but differed in the following particulars :—General appearance of plumage less brilliant ; tail not so lyrate ; belly, sides, and vent white ; inner wing-quills margined with white. I supposed at the time this was a young bird ; but subsequent experience leads me to think that, if not a variety, it may be a distinct species *.

192. *TCHITREA PARADISI* (Linnæus).

Western Himalayas and Valley of Cashmere during summer ; India at all seasons ; pretty common. Frequents groves and dense jungles. Great variety of plumage ; all white birds are adult males ; of the brown varieties, the *females* have brown primaries, the *young males* have black primaries.

193. *LEUCOCERCA FUSCOVENTRIS* (Franklin).

Common around Poonah in the Deccan.

194. *LEUCOCERCA ALBOFRONTATA* (Franklin).

Scinde ; Western Himalayas, but on the lower ranges only.

195. *HYPSSIPETES PSAROIDES*, Vigors.

Plumage of sexes alike. Very common in the thick jungles of the Cashmere Ranges, generally seen in small flocks. Has great powers of flight ; shy ; call-note loud and harsh ; imitates the notes of other birds. Confined to certain districts on the Himalayas.

196. *PYCNONOTUS BENGALENSIS* (Blyth).197. *PYCNONOTUS HÆMORRHOUS* (Blyth), J. A. S. B. xiv.

* ? *D. cærulescens*, Linn.—F. M.

198. *PYCNONOTUS BARBATUS*, Desfontaines (*P. leucotis*, Gould).

199. *PYCNONOTUS LEUCOGENYS* (Gray).

The Bulbuls have obtained more praise for their musical powers than they really deserve; their notes are generally harsh, short, and often repeated; they often imitate the songs of other birds. They are frequently domesticated, and taught a variety of tricks. In some parts of the Punjab I observed the natives were very fond of carrying the *hæmorrhous* and *leucogenys* about with them, tethered to the hand by a string. The *hæmorrhous* is the most widely distributed; it is found all over the Deccan (but not in Scinde), and the cultivated districts of the lower Himalayan Ranges. *Bengalensis* and *leucogenys* are common on the lower Himalayas; and although the former is abundant on the ranges around Cashmere, I never saw it in the valley. The latter is the only one of the genus found in the valley, and is very common; its habits are domestic; it frequents gardens and orchards. I have often, when sailing in an open boat on the river Jhelum at Serinuggar, been visited by this species; it would perch itself on the side of my boat within an arm's length, quite regardless of the oarsmen and the splash of their paddles.

The *leucotis* I saw nowhere out of Scinde; at Kurrachee and on the banks of the Indus it is common. Insects constitute the favourite food of the Bulbuls; but they are likewise partial to fruit, and give a preference to mulberries. The call-note is a loud clanging chirp, uttered at short intervals. The *vents* of the young birds are light brown; they have no *crests* until after the first moult.

PYCNONOTUS JOCOSUS is a common cage bird in the Deccan and Punjab; but I have not seen it in a wild state. It is certainly rare in the Punjab and Western Himalayas.

200. *IORA ZEYLANICA*, Gmelin.

Deccan, abundant all over the wooded districts. Habits like the Tits; frequents the densest foliage of fruit trees: food, insects. Not seen on the Western Himalayas or Punjab.

201. *ORIOLOUS KUNDOO*, Sykes.

Deccan, Scinde, lower Himalayan Ranges. Abundant during summer in the Vale of Cashmere. Call-note loud and harsh; the song resembles that of the Blackbird. Iris *red*.

202. *ZOSTEROPS PALPEBROSUS*, Temminck.

Very common in the woods and jungle of the lower ranges of the Western Himalayas. In habits closely resembling the Tits; very tame, and will often approach within a few feet of one, when searching for insects.

203. *ÆTHOPYGA MILES* (Hodgson).

Syn. *Nectarinia goalpariensis*, Jerdon.

Strictly Himalayan, not seen by me in the plains of India; fre-

quents the dense jungles of the lower ranges ; by no means common anywhere ; generally seen solitary. Note soft, sweet, and musical ; delights in sheltered and sequestered places.

204. *NECTARINIA ASIATICA* (Linnæus).

The varieties of this species are only immature birds. Deccan, Scinde, Punjab, and lower Himalayan Ranges, common : the song resembles that of the Chaffinch, is less strong, but more sweet and melodious : call-notes loud and various.

205. *NECTARINIA ZEYLONICA* (Linnæus).

Deccan (at Poonah abundant), not seen in Scinde, not common on the Western Himalayas. The nest is less than that of the Long-tailed Tit, composed of grass interwoven with dried leaves, and usually suspended from the point of a branch. Is frequently seen sucking the nectar from the flowers of the Cactus. The species is common in the gardens at Poonah in the Deccan : it does not subsist on honey only ; for the gizzards of several species contained small insects.

206. *TRERON PHENICOPTERA* (Latham).

A summer visitor on the lower ranges and forests of the Western Himalayas. Feet *yellow*.

207. *PALUMBUS TORQUATUS* (Leach).

Common on the lower Himalayan Ranges and in the Salt and Suliman Mountains of the Punjab. The nuchal patch is frequently indistinct, and in all the specimens examined was of a buff-clay colour. Gregarious.

208. *COLUMBA LIVIA*, Brisson.

India and wooded ranges of the Western Himalayas, common.

Note.—Flocks of a pied variety were seen on the rocky mountains in Rupshoo Ladakh, having the rump and under surfaces of the wings *white* ; tail with a broad white band across its middle, tip black : they were mixed up with flocks of the true species.

209. *COLUMBA LEUCONOTA*, Vigors.

Imperial Rock Pigeon of Europeans.

Inhabits the high and rocky ranges north of Cashmere near the confines of snow ; seen frequently associating with *livia*. Iris yellow ; flight strong and rapid. Plentiful in spring in the Valley of Wurdwun among the Cashmere ranges.

210. *TURTUR HUMILIS* (Temminck).

Deccan, Scinde, and Punjab, common ; very plentiful in the Vale of Cashmere, and all over the lower ranges of the Western Himalayas.

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211. *TURTUR SURATENSIS* (Latham).

Deccan and lower Himalayan Ranges, common.

212. *TURTUR ORIENTALIS* (Latham).

Western Himalayas, including Cashmere and Ladakh, common.

213. *TURTUR SENEGALENSIS* (Linnæus).

Deccan, Scinde, Punjab: not seen on the Western Himalayas.

214. *PAVO CRISTATUS*, Linnæus.

Commonly called "Mo-or" by the natives of the Punjab and lower Himalayan Ranges. Is very generally distributed over these parts; is held sacred by many *castes*, and accordingly well preserved. At Kullar Kuhar, among the Salt Mountains of the Punjab, there are several shrines where the Pea-fowl collect from the neighbouring jungles to be fed by the fakirs and religious devotees; there, at break of day, as the sportsman is clambering over the rough sides of the ravines in quest of Houriar (*Ovis vignei*), he will often be struck with the scene, as hundreds of male Pea-fowl, in all their native elegance and beauty, dash down the glens with a rapidity of flight unknown to the denizens of the English farm-yard. Many sportsmen ignore this species, and will not allow it a place in their game-list: it is true that in many localities they might be killed with little trouble; but among the dense and tangled jungles of the lower Himalayan Ranges it is found wild and wary.

215. *CERIORNIS MELANOCEPHALA* (Gray).

Tragopan hastingsii, Vigors.

Jewaz of the natives. Argus Pheasant of Europeans.

This very handsome and beautiful species is a native of the higher ranges of the N.W. Himalayas. Distant from the habitations of man, among the dense woods and jungles of the middle ranges, this shy and wary bird secretes itself. Generally seen in small companies of from three to ten or fifteen. It is nearly three times the size of the Colchican Pheasant. When alarmed, it utters a loud wailing cry of *uā, ā, ā, ā*, particularly at twilight; and the sportsman is often struck by its peculiar call long before he becomes acquainted with the bird. They run with great rapidity, and secrete themselves among the thick foliage, allowing the sportsman to approach within a few yards; indeed it is seldom, unless when hard pressed, they take to flight. Common on the wooded ranges N.W. of Simla, and Southern Pinjal forests of Cashmere.

216. *GALLUS FERRUGINEUS* (Gmelin).

Gallus bankiva, Temminck.

Sub-Himalayan jungles, but confined to localities; common near Simla, rare on the ranges south of Cashmere and westward of Jamoo.

217. *EUPLOCAMUS ALBOCRISTATUS* (Vigors).

Called Kallege, Kookera, Meerghée, by the natives. *E. melanotus*, Blyth, comes very close to this bird, but has not the white markings on the crest and back; yet the species is subject to variety; so much so, that it is questionable if Blyth's bird is a distinct species. Abundant on the ranges around Simla; not common on the Cashmere Ranges. This is the most common and widely distributed of all the Pheasants on the Western Himalayan Ranges. Unlike any of the other species, it is found from the Sewalik Range to the limits of forest. The average weight of the male is about 3 lbs.; the female about 2½ lbs.; young birds of the first year from 1½ to 1½ lb. The plumage of the young is like that of the female until the first moult. When a Kallege Pheasant is flushed, it utters a succession of short calls like the word "pink;" that of the young bird is harsher, and resembles the call of the *P. wallichii*, for which it is often mistaken. They spend the day in dense jungles, perching on trees at night, to which they often betake themselves when flushed. Their flight is strong and rapid; when on the ground, the male walks with the tail half erect, and spreading. The food consists of soft roots, acorns, &c.; the former they dig up with their bills, shuffling the earth with their feet like the domestic fowl. They run with great rapidity, and are very cunning: when roosting, they secrete themselves among the thickest foliage, and will not stir even when the sportsman may be within a few yards. Among their winged enemies are the Lämmergeiers, *Aq. neriæ*, &c. The Pine Martin (*Martes flavigula*, Bodd.) preys on the species, and eats its eggs; the latter are white, and about the size of the Bantams.

218. *CATREUS WALLICHII* (Hardwicke).

Native names: Cheer, Booinchil, Herril.

Frequents the lower and intermediate regions of the Western Himalayas; is seldom found at very high elevations. A wary bird, cunning and vigilant, its favourite resorts are grassy hills, with scattered forests of oak or underwood: generally found in flocks of from four to twelve. They run fast, and when disturbed secrete themselves among grass, or take to trees, and keep so quiet that the sportsman may approach within a few yards; they are sometimes even knocked off their perch with a stick. The call-note or crow resembles the words "*chir a pir, chir a pir, chir, chir, chirwa chir, chirwa.*" The food consists of grubs, insects, seeds and berries; I never found any grass or leaves in their gizzards. It is easily reared; but it seems doubtful if the species would stand the climate of Britain. The female makes her nest in the grass, or among low brushwood, and lays from 9 to 12 eggs of a dull white: the young are hatched about the end of May. The flight of this species is neither strong nor rapid; when roused, it utters a few loud cries, and flies only a short distance: the beautiful feathers of the tail are spread out during flight.

219. *PUCRASIA MACROLOPHA* (Lesson).

Local names, Coclass, Pocrass, Plach.

Is seldom found at any elevation under 5000 feet on the Western Himalayas; nowhere very common. On the Choor Mountain, near Simla, it is plentiful, and frequently found in the same jungles with the last two species: more solitary in its habits than either of the other two, and usually seen single or in pairs. Its call is composed of a few chuckles or low chattering sounds; the males crow at day-break; the call resembles that of a young domestic cock. Roosts in trees. Food various, composed of leaves, buds, roots, insects, seeds and acorns. The eggs are spotted like a Turkey's.

Note.—The Plach Pheasant, so common in the jungles of the Cashmere Ranges, I have not examined, but am inclined to think it is a different species; its *crow* is different.

220. *LOPHOPHORUS IMPEYANUS* (Latham).

The local names for this species are very various. The Cashmerees call the male "Lont," and the female "Ham." On the ranges around Mussouree the natives call the male "Ghur Monal," the female "Ratteeah Cowan" and "Monalee."

This splendid bird, once so abundant on the Western Himalayas, is now far from being so, in consequence of the numbers killed by sportsmen on account of its beauty; whole tracts of mountain forest once frequented by the Monal are now almost without a single specimen: however, its range is wide, and its haunts varied, so that it will be long before the species can be entirely exterminated. The Monal frequents the high regions of the Western Ranges, and lives among the oak forests, dense bamboo jungles, or craggy mountainsides. Its favourite food consists of roots and bulbs, particularly the wild strawberry, currant, earth-nuts, acorns, &c. Its eggs are a little less than a Turkey's, and similarly marked. The average weight of adult males is 6 lbs.; that of the females 5 lbs.: the young birds resemble the female until the first moult. Monal-shooting far eclipses anything of the sort, British or European; it calls forth all the energies of the sportsman. Scrambling over precipices, mounting over wooded slopes, or threading his way through tangled bush, these noble birds spring up before him, uttering their wild cry as they dash down the glens, refulgent in all their beauty and elegance of form. Among the most pleasant reminiscences of by-gone days is a period of eleven days spent by the author and a friend on the Choor Mountain, near Simla, when among other trophies were numbered 68 Monal Pheasants, 9 Plach, 4 Kallege, 1 Wood Partridge, Chuckor (*P. chukar*), and Solitary Snipe. The Bearded Vulture and Pine Martin (*M. naviqula*) are the greatest enemies of the Monal: the former kills the old birds; the latter destroys the eggs and young.

221. *TETRAGALLUS HIMALAYENSIS* (Hardw.).

Local name, "Jer Monal;" by the natives of Cashmere, "Gourka gu" and "Kubuk." Snow Pheasant of Europeans. Confined to the snowy ranges of the Western Himalayas, above the region of forest trees; is not universally distributed; plentiful in Koonawer, Cheenee, the high ranges of Cashmere, and Ladakh. In the summer months, as the snow melts, they migrate northwards; and during rigorous winters are often driven into the forests of the Middle Ranges. I have seen them on the Peer Pinjal Ranges, south of Cashmere, in July, but only on the tops of the highest peaks, 12,000 or 13,000 feet above the level of the sea. Generally seen in flocks of from twenty to thirty together by the margin of the melting snow: they are partial to these situations, where they feed on the tender shoots of plants just appearing above ground. In summer I have seldom met more than a pair together; indeed, on the ranges frequented by the bird during the winter months, not one is seen in June and July. The Golden Eagle and Bearded Vulture are great tormentors of this species: I do not think they destroy old birds; but the young fall an easy prey to them. They never perch on trees, but prefer rocks or eminences close to snow, where they are with difficulty seen even within 100 yards distance; their loud wailing cry, however, is heard far off. The tail is carried erect while on the ground; and their ungainly gait resembles that of a large Grey Goose. They always feed upwards towards the tops of the mountains, walking slowly. The species of wild *Primula* constitute their favourite food. The call is very various, something like the following: *whōō wit whit whit wit wit wit wēēt wēēt wēē*; it is a soft whistle. These birds are very tame, and approached without difficulty from below, as they fly always down the mountain when flushed, and seldom rise until the sportsman is within thirty yards. The flesh is not savoury, and frequently of a disagreeable flavour. Having seen the bird at all seasons on the Cashmere Ranges, I am inclined to think they breed there, although the majority migrate to Chinese Tartary in summer. A hardy species, and stands confinement well.

222. *LERVA NIVICOLA* (Hodgson).

Local, Quoir Monal. Snow Partridge of Europeans.

Frequents like situations to the last bird; but its haunts are more selected: it is less generally distributed; occasionally seen on the highest mountains forming the northern barrier of the Vale of Cashmere. Is very tame; when flushed emits a loud harsh whistle, and continues the call even when settled and out of danger. Its general appearance and habits very closely resemble the Snow Pheasant. The female lays six or eight eggs, and during incubation displays the same desire to draw away the attention of the sportsman as observed in the family generally.

223. *PTEROCLES ARENARIUS* (Pallas).

Punjab; N.W. Provinces of Bengal: common.

224. *PTEROCLES EXUSTUS*, Temminck.

Punjab ; N.W. Provinces of Bengal : common.

225. *PTEROCLES FASCIATUS* (Scopoli).

Pretty common in the low jungles around the base of the Sewalik Range, Punjab.

226. *SYNAPTES TIBETANUS*, Gould.

This new species I met with on the Salt Lakes of Ladakh in August 1852 ; confined to Ladakh, and not found in India.

227. *FRANCOLINUS VULGARIS*, Stephens.

Tetrao francolinus, Linnæus.

Local name, Kala Tetur. Black Partridge of Europeans.

The Black Partridge enjoys a far wider range than any of the other Francolins of India. It is plentiful in Bombay and Bengal, and on the lower ranges of the Western Himalayas at all seasons. Neither the torrid heat of the plains nor the snows of the high ranges seem to affect this bird. I brought a pair to England with me in 1855 ; I think the species would thrive in this climate. It is not gregarious ; seldom more than a pair are found together : its flesh is pale and well-flavoured ; but neither the Black Partridge nor any of the Indian game birds will bear comparison in this respect with the game birds of Britain. They commence to pair about the beginning of April on the Himalayas, but earlier on the plains of India ; the young remain with the parents a long time, and are not fit for shooting until the latter end of October. During incubation the males can be heard answering one another all over the mountains ; the call is harsh, and composed of four distinct sounds following each other in this manner : *whée-wha-whieh ä whiëk*, repeated at short intervals when perched on a stone or in dense cover.

228. *CACCABIS CHUKAR* (Gray).

Chuckor of the natives and Europeans.

It is found in small numbers among the ravines and low barren hills north of the river Jhelum, Punjab ; but the low ranges of the Western Himalayas may be said to be its proper limits ; from this it extends northwards to Tibet and Chinese Tartary, as far north as Europeans have yet penetrated. It is said to abound in Persia and Afghanistan. I have no doubt, from the countries it frequents and its nature and habits, this bird would thrive equally well on the mountains of Scotland. Its favourite haunts are bleak and barren mountains covered only with low scrub. Usually seen in coveys ; the flight is strong and rapid. The breeding-season commences about the middle of May ; the nest, composed of dried grass, is placed under the cover of a jutting rock, or in thick jungle. It lays from nine to twelve eggs of a pure white colour, which are usually hatched in July. The young birds grow rapidly, and attain the size

of the parent before they can fly, and, strictly speaking, are not fit for shooting until the middle of September. During incubation, the male remains near the nest, and can be heard calling all day; its call much resembles that of the domestic hen, being a "*cuc cuc*" repeated often. There is no difference in the plumage of the sexes; only the males have rudimentary spurs. The Chuckor is easily domesticated, and will associate with poultry. The Cashmerees call it Kau-Kau, from its cry; although not found in the valley, it is common on the low hills around. This bird probably affords better sport than any other species of the family in India, as the rapidity of its flight and the situations it frequents try the energies of the sportsman.

229. *AMMOPERDIX BONHAMI* (G. R. Gray).

The existence of this species has been known for several years; but until lately all the specimens were brought from Afghanistan, where it abounds on sandy wastes and barren mountains. It is plentiful on the low hills of the Northern Punjab, particularly the Salt and Suliman Ranges; I do not think it is found further south than the former mountains, and I never saw the species on the Western Himalayas. It bears a close resemblance in habits to the last species, and is often seen with it. It is known by the name of "Sisi" in the Punjab.

230. *PERDIX HODGSONII* (Gould, B. A.).

Tibet Partridge.

As early as 1841 Mr. Wilson, an indefatigable and discerning sportsman, shot a species of Partridge near the village of Soukee, on the Snowy Ranges north of Mussouree; and from the description given by him in his "Notes on the Habits of the Game Birds of the Himalayas," published in the December number of the 'Calcutta Sporting Review' for 1848, I had no difficulty in detecting its similarity to a specimen killed by Capt. Smith, 75th Regiment, in Nobra, Northern Ladakh, during the summer of 1854. Mr. Hodgson met with the species on the Nipal Ranges, and subsequently published an account of it in the 'Journal of the Asiatic Society of Bengal,' vol. xxv. p. 165; but to Captain Smith is the credit due of having brought the first specimen to Europe, from which Mr. Gould's delineation was taken. Captain Smith's specimen has since been deposited in the British Museum. It would appear, from Wilson's and Smith's accounts, that the bird is very rare in the districts they visited, which I apprehend were only its most southern limits.

231. *ARBORICOLA TORQUEOLA* (Valenciennes).

Wood Partridge and Hill Partridge of Europeans; Ban tetra of the natives.

Nowhere common; frequents forests and thick jungles, generally seen single or in pairs; a few are occasionally met with in the oak forests on the ranges around Simla, Western Himalayas.

232. *PERDICULA ASIATICA* (Latham).*Coturnix pentah*, Sykes.

"Lowa" of the natives; Bush Quail of Europeans.

Frequents the valleys of the lower ranges of the Western Himalayas; gregarious and migratory. Its food consists of small seeds, such as mustard. Rises with a quick whirring noise; flies only a short distance, frequently dropping into the nearest bush, where it secretes itself. I have not seen this species on the plains of India.

233. *COTURNIX COMMUNIS*, Bonnaterre.*Tetrao coturnix*, Linnæus.

Dispersed all over India; assembling in great numbers during the ripening of the spring and autumn crops. Breeds in the dense jungles.

234. *COTURNIX COROMANDELICA* (Gmelin).

Rain Quail.

Not uncommon during the rains in the gardens and fields around Poonah in the Deccan; not seen in Scinde, Punjab, or the Himalaya Mountains.

235. *OTIS MACQUEENII* (Hard.).

Common in Scinde; found in the country between Loodeana and Ferozepoor, likewise in various parts of the Punjab. They frequent sandy plains alternating with patches of long grass and fields of grain, and cause much destruction in wheat-fields by eating the young shoots. Iris black; *sclerotic* coat yellow; eye large and globular. This bird is migratory in the above districts, and only seen in winter; doubtless it comes from Persia, where it is said to be found at all seasons. English sportsmen call this bird "Hau-bara."

236. *EUPODOTIS EDWARDII* (Gray).*Otis nigriceps* (Vigors).

Found occasionally near Poonah in the Deccan; not common. It is said to have been seen in the Valley of Peshawur, but this only from native reports.

237. *CURSURIUS COROMANDELICUS* (Gmelin).

Pretty common on the sandy wastes of Scinde; gregarious; seen usually in flocks of fifteen or twenty. Runs with great speed. Favourite food, a species of Sand Locust. The flesh of this bird is very tender and wholesome.

238. *ÆDICNEMUS CREPITANS* (Temminck).

"Khurma" of the natives.

Bastard Floriken of Sportsmen.

On the banks of the Jhelum River, from the town of Jhelum south-

ward ; in the jungles between Ferozepoor and the Himalayas ; partial to certain localities : common.

239. *LOBIVANELLUS GOENSIS* (Gmelin).

Did de-do-it of Europeans (expressive of cry).

Is widely distributed over the Deccan, Scinde, Bengal, Cashmere, and the lower ranges of the Western Himalayas ; they frequent rice fields, pools, and marshes ; and the well-known cry renders the species familiar to every European in the East. Often heard at night, the words resemble the following : "*Did you do-it, did you do-it, did did did did you do it dōō it dōō it, &c.*" Its habits very much resemble the *Tringa vanellus* ; generally seen in couples ; does not migrate.

240. *VANELLUS CRISTATUS*, Meyer.

Makes its appearance about the month of October on the N.W. frontier of the Punjab, and remains until March. I think they migrate to Afghanistan ; and, from not seeing the species south of Rawul Pindee, I am inclined to think they are only found on the pools and marshes around Peshawur, Attock, &c.

241. *CHÆTUSIA GREGARIA* (Pallas).

Pretty common during the cold months in the fields and wastes near Loodeana, in the N.W. Provinces of Bengal.

242. *HIATICULA RUFINELLA*, Blyth, Ann. N. H. 1833.

? *Charadrius leschenaultii*, Lesson.

I shot a specimen of this species on the Chimouraree Lake, in Ladakh ; it is now in the possession of Sir William Jardine, Bart. The species breeds in that locality ; not seen in the Punjab.

243. *HIATICULA PHILIPPINA* (Scopoli).

Frequents the rivers and streams in the Deccan, Punjab, and Cashmere : common.

244. *HIMANTOPUS CANDIDUS* (Bonn.).

On the pools and marshes of the Punjab. I have frequently seen its legs bent and deformed. There is considerable variety of plumage, owing to age or sex. *Quære*, is *H. intermedius*, Blyth, J. A. S. xviii., a distinct species, or only a variety of those above ?

245. *IBIDORHYNCHUS STRUTHERSII*, Vigors.

Met with the above on one of the branches of the Dras River (Kurste, near the Ligla Pass) in Ladakh : by no means common, and not seen elsewhere.

246. *TOTANUS GLOTTIS* (Linnæus).

Generally distributed over the Deccan, Scinde, Bengal, and the

Himalayas, as far north as Chinese Tartary ; solitary in its habits ; frequents pools and streams.

247. *TOTANUS CALIDRIS* (Linnæus).

248. *ACTITIS OCHROPUS* (Linnæus).

249. *ACTITIS HYPOLEUCUS* (Linnæus).

250. *LIMOSA ŒGOCEPHALA* (Linnæus).

Also generally distributed over the Deccan, Scinde, Bengal, and the Himalayas, as far north as Chinese Tartary : all are common.

251. *NUMENIUS ARQUATA*, Linnæus.

Lakes of Cashmere and rivers of the Punjab, pretty common.

252. *NUMENIUS PHŒOPUS*, Linnæus.

Mouth of the Indus, near Kurrachee, on the sea-coast : common.

253. *TRINGA MINUTA*, Leisler.

Rivers of the Punjab, common.

254. *PHILOMACHUS PUGNAX* (Linnæus).

Is found on the lakes and marshes of the Punjab during the cold months, but migrates towards the end of April. Before departure, they assemble in flocks. I have never seen the males in their complete plumage.

255. *SCOLOPAX RUSTICOLA*, Linnæus.

The Woodcock breeds in the pine forests of the Western Himalayas ; during winter it repairs to the valleys of the lesser ranges. Not uncommon in the forests of Cashmere ; but they do not occur in numbers sufficient to repay the necessary toil in searching for them. The Western Ghauts and Nilgiris are likewise localities frequented by this species.

256. *GALLINAGO NEMORICOLA* (Hodgson).

In the lonely glens, by the side of some mountain streams, where the pine grows tall and dense, and the sun's rays seldom penetrate, there we meet the Solitary Snipe, from the lowest ranges of the Himalayas to the limits of its forest. Nowhere common ; many old Himalayan sportsmen have never seen it. I have observed considerable variety in regard to size of different specimens. One killed on a mountain near Simla was not larger than a Common Snipe.

257. *GALLINAGO SCOLOPACINUS*, Bonap.

258. *GALLINAGO GALLINULA* (Linnæus).

The Common and Jack Snipe abound all over India, and during

winter on the fens and marshes of Cashmere. Their migrations are not well defined. I found them abundant at Poonah in November, whereas they are not plentiful in Bengal or the Punjab until the latter end of December, and disappear by the end of April. A few are found all the year round in the marshes of Bengal, where they doubtless breed. Although common in winter in the Vale of Cashmere, I never saw a single specimen in summer. I think they leave N. W. India and Cashmere to breed in the more temperate parts of Persia or Afghanistan, as the few seen during the hot months will not account for the tremendous numbers which frequent the marshes during the cold season.

259. *RHYNCHEA BENGALENSIS* (Linnæus).

There is considerable variety of plumage in some specimens. Comes in with the last two, and, although not nearly so common, is by no means rare in the Punjab and Deccan.

260. *HYDROPHASIANUS CHIRURGUS* (Scopoli).

Water Pheasant of Europeans.

Is very common on the lotus-covered lakes of Cashmere, where it breeds. Its favourite attitude is sitting on the broad leaf of the lotus. Flight irregular and flapping. Food, insects. Call, harsh, and resembles that of the Water-hen. Is not confined to the lakes in the valley, but sometimes makes excursions up the streams, and has been found in the interior ranges. Not found in the Punjab.

261. *GRUS CINEREA*, Bechst.

Is very abundant during the cold months on the rivers of the Punjab. They migrate evidently from the west, and return again before the commencement of the hot weather. The numbers that frequent the banks of the Jhelum below the city of that name and the confluence with the Chenab, are almost beyond conception; they commit great havoc in the wheat-fields. They are shy and difficult of approach.

Note.—The *Ardea virgo* and *Grus antigone* I have not seen in the Punjab: the former is said to be common on the banks of the Jumna, Chumbel, and Soane; the latter, it would appear, does not visit the upper provinces of Bengal.

262. *FALCINELLUS IGNEUS* (Gmelin).

Black Curlew.

Common in the Deccan and Punjab; frequents marshy places, and feeds on carrion, beetles, scorpions, &c. Generally seen in pairs, or three together. Associates with Rooks on the frontier of the Punjab. Native name, "*Kutchechorrah*."

263. *PLATALEA LEUCORODIA*, Linnæus.

Plentiful on the rivers of the Punjab during winter.

264. *CICONIA ALBA* (Belon).

A winter visitor on the rivers of the Punjab; not common, having only seen one specimen on the Chenab.

265. *CICONIA NIGRA* (Linnæus).

Shot a female on the Jhelum River, in the Vale of Cashmere. I did not see it elsewhere.

266. *CICONIA LEUCOCEPHALA* (Gmelin).

I procured a specimen of this near Poonah, and observed it (what was doubtless the same species) on the wing on the river Indus.

267. *ARDEA CINEREA* (Linnæus).

Common in the Deccan, Indus, and rivers of Punjab. Plentiful in the Valley of Cashmere. There is a large heronry in the celebrated Shalimar Garden, where the bird is preserved by the present ruler on account of its feathers, which furnish the plumes for the turbans of the royal princes of Cashmere.

268. *HERODIAS ALBA* (Linnæus).

Indus river, seen only on the wing?.

269. *HERODIAS BUBULCUS* (Savigny).

Common on the marshes and in the rice-fields of the Deccan.

270. *ARDEA COMATA*, Pallas.

Squacco Heron.

Generally distributed over the lakes and *geels* of the Punjab.

271. *BOTAURUS STELLARIS* (Linnæus).

A winter visitor in the Punjab, and all the year in Cashmere.

272. *ARDETTA MINUTA* (Linnæus).

Less common than the last, and perhaps only found during the cold months in the *geels* and lakes of the Punjab.

273. *RALLUS STRIATUS* (Linnæus).

Punjab, pretty common in winter.

274. *RALLUS INDICUS*, Blyth; J. A. S. xviii. p. 820.

Punjab during the winter months, common.

275. *GALLINULA CHLOROPUS* (Linnæus).

N. W. India and Cashmere, common.

276. *FULICA ATRA*, Linnæus.

Lakes and fens of the Punjab and Cashmere, common. Resident in the above-mentioned localities during the year.

277. *LARUS RIDIBUNDUS*, Linnæus.

Breeds on the fresh- and salt-water lakes of Ladakh.

278. *LARUS BRUNNICEPHALUS*, Jerdon.

Indus and rivers of Punjab. Common.

279. *GELOCHELIDON ANGLICUS* (Montagu).

Indus river. Common during the winter months.

280. *STERNA HIRUNDO*, Linnæus.

Indus and rivers of the Punjab. Lakes and fens of Cashmere. Common.

281. *STERNA JAVANICA*, Horsfield.

Indus, rivers of Punjab, Cashmere. Very common.

282. *PELICANUS JAVANICUS*, Horsfield.

Indus, but seldom on the rivers of the Punjab. Common.

283. *GRACULUS CARBO*, Linnæus.

Common on the Indus, Punjab rivers, lakes and rivers of Cashmere.

284. *GRACULUS SINENSIS* (Shaw).

Punjab rivers and Cashmere. Pretty common on the former in winter; at all seasons on the Jhelum River, Cashmere.

285. *GRACULUS PYGMÆUS* (Dallas).

Punjab rivers, not common.

286. *PHENICOPTERUS ROSEUS*, Pallas.

Punjab rivers and lakes during the cold months. Gregarious. They march about in the shallows, or remain motionless, standing on one leg, with their heads under their wings. Average length of several specimens measured, from bill to extremity of great toe, 5 feet 7½ inches; between tips of wings, 5 feet 10 inches. Weight, 5 lbs.?

287. *ANSER ALBIFRONS*, Linnæus.

Identical with specimens in the British Museum. A winter visitor to the rivers and lakes of the Punjab. Average weight, about 5 lbs.

288. *BERNICLA INDICA* (Gmelin).

Bar-headed Goose of European sportsmen.

Is very common on the Indus and rivers of the Punjab during the cold months. Generally seen in very large flocks.

289. *CASARKA RUTILA* (Pallas).

Indus and Punjab rivers, Cashmere. Breeds in great numbers by the sides of the fresh- and salt-water lakes of Ladakh.

290. *ANAS CLYPEATA*, Linnæus.

Indus and Punjab rivers in winter. Common.

291. *ANAS BOSCHAS*, Linnæus.

Indus and rivers of Punjab in winter. Breeds and remains all the year in the Valley of Cashmere.

292. *ANAS PŒCILORHYNCHA*, Pennant.

Indus, only in winter.

293. *ANAS ACUTA*, Linnæus.

Indus ; Punjab ; Cashmere. Abundant during the winter months.

294. *QUERQUEDULA CRECCA* (Linnæus).

India. Common.

295. *QUERQUEDULA CIRCIA* (Linnæus).

Punjab rivers and lakes during the cold months. Common.

296. *FULIGULA RUFINA* (Pallas).

A winter visitor on the lakes and rivers of the Punjab. Not common. Average weight of male 3 lbs. Iris red.

297. *FULIGULA NYROCA* (Guldenstedt).

Frequents the lakes of Cashmere, and remains there all the year. Very common on the City Lake. A winter visitor in the Punjab, associating generally with the *Querq. crecca*.

298. *MERGELLUS ALBELLUS* (Linnæus).

Migratory. Common on the lakes and rivers of the Punjab during the cold months.

299. *PODICEPS PHILIPPENSIS*, Gmelin.

Very common at all seasons on the Cashmere lakes. A winter visitor in the Punjab.

There are few more interesting studies in natural science than that of the migrations of birds ; and Northern India and its large rivers afford excellent opportunities of enriching one's knowledge on this head. Every one who has traversed the great rivers of Northern India must have been struck during the winter months on observing the vast flocks of wildfowl that frequent the sands and creeks of the Ganges, Indus, and rivers of the Punjab, or the lakes and fens inland.

What becomes of these large flocks during summer ? for in June or July, should he revisit these rivers, he must observe the absence of all these interesting objects. Oft has the question been asked, and the answer been much the same : "They go away during summer, and come back in winter." But where do they go to ? they surely do not migrate southwards : for it is hot enough in all consequence in Scinde or the Punjab in summer ; and the banks of the

Indus are as hot as the banks of any river in India or elsewhere. That the temperate latitudes of Central Asia form their summer retreats, I think cannot be doubted. I spent the greater part of three years on the north-west frontier of the Punjab, and one year very near the Khyber Pass, besides visiting the lakes of Cashmere and Tibet, which afforded me good opportunities of observing the habits of these interesting wanderers. The Bar-headed Goose (*Bernicla Indica*), so plentiful in the Punjab, can be seen in vast flocks passing over Peshawur in a southerly direction. I have seen lines of these birds of a mile in length; and often, at night, their rough gabblings can be distinctly heard. It seems, during their migrations, they fly all night, and rest on the banks of rivers or lakes during the heat of the day. The immense flocks of Cranes (*Grus cinerea*), seen likewise at this season steering their course southwards, explains the direction of their migrations; the same remark is applicable to the Mallard, Teal, Gargany, and Shovellers. The Ferruginous Duck (*A. rutila*) and *Anser albifrons* appear on the marshes and rivers of the N.W. frontier towards the end of November. In my journal I find the following remarks:—"December 11th, Rawul Pindee.—Shot three Grey Geese (*A. albifrons*) on a marsh in this neighbourhood: they had evidently just arrived; for they were very thin, and could not fly any distance. The Lap-wing (*V. cristatus*) has been seen in the marshes for some time, generally in small flocks. The Pin-tail, Castaneous and Red-crested Duck (*Fuligula rufina*), are arriving daily."

The Greater Sand-grouse (*Pterocles arenarius*) migrates probably to Afghanistan or Persia during summer; for when at Peshawur I saw large flocks constantly flying southward at the commencement of winter. The Rook comes certainly from the west, for reasons mentioned elsewhere; and the European Jackdaw, Chimney-swallow, and Sand-marten from Cashmere. The *Turdus atrogularis*, so common in the gardens and orchards around Peshawur during winter, is evidently a migratory bird; but its summer habitat may not be very far across the neighbouring mountains, as I found it at all seasons on the Himalayas at elevations of 8000 or 9000 feet above the level of the sea.

Regarding Cashmere, there is perhaps no place in the world where wild fowl are more abundant during the winter months. The magnificent Waller Lake and every pond are literally crawling with Ducks, &c.; the inhabitants kill and destroy them without mercy; the bazars of the cities are filled with game at this season. A fine goose can be purchased for about twopence English: but nearly all take their departure before the end of April; and, except a few stragglers and residents, the Waller Lake in May presents an immense pond whose placid waters the fairy-like Tern is seldom seen to ruffle. I found the *Anas rutila* breeding among the rocks surrounding the fresh- and salt-water lakes of Ladakh, and the *Bernicla indica* and *Anser albifrons* were seen in great numbers in June and July on the Chimmauraree Lake. These lakes are about as far north as it is safe at present for Europeans to travel. The

Chinese Tartars strongly object to our entering their country ; so that our researches on this subject are somewhat narrowly defined. Unfortunately, the Afghans have had little confidence in the British since 1842, so that their mountains and even the Peshawur Ranges remain yet unexplored ; but when every facility can be obtained on the Western Himalayas, I am confident there is much yet to be done. There is much interest connected with the natural history of the two vast regions, Punjab and Himalayas, so intimately adjoining each other, yet so very different in climate and appearance ; and sure am I that well will he be repaid for his trouble who zealously investigates their hidden treasures.

During nearly seven years I resided in various parts of India, commencing at Poonah in the Deccan ; afterwards I journeyed through Scinde, and passed across the upper provinces, and was some time stationed on the lower Himalayan Ranges near Simla ; I then traversed the Punjab northwards to Peshawur, and twice visited Cashmere and Ladakh. In my excursions I made it a rule to commit to paper minute descriptions of every animal I killed ; and, although by means of comparison and the assistance of friends I have been enabled to identify more than half my collection, I find a large number of species remain yet unnamed, many of which are doubtless rare and interesting. I am sensible, however, of the amount of gratitude I owe to many friends for their counsel and assistance, among others, to Mr. Moore, Curator of the Derby Museum, Liverpool, who not only afforded me every facility for examining specimens in that rare collection, but also rendered me valuable assistance by placing the excellent library of reference of that institution at my disposal.

Since these notes were begun, I have been informed by my very kind friend, J. Gould, Esq., that the rare *Pyrrhula* described in this paper, is a new species, and has been described and figured in the last number of his 'Birds of Asia.'

7. REMARKS ON THE HABITS AND HAUNTS OF SOME OF THE MAMMALIA FOUND IN VARIOUS PARTS OF INDIA AND THE WESTERN HIMALAYAN MOUNTAINS. BY A. LEITH ADAMS, SURGEON, 22ND REGIMENT. COMMUNICATED BY MESSRS. T. J. AND F. MOORE.

1. SEMNOPITHECUS ENTELLUS (Dufresne, sp.).
2. SEMNOPITHECUS SCHISTACEUS, Hodgson.
3. MACACUS RHESUS (Audub.).

All the above species are found in the Western Himalayas ; the *M. rhesus* is probably the most common and generally distributed over the wooded districts.

4. PTEROPUS EDWARDSI, Geoff.

I found this species abundant at Poonah in the Deccan. On a

peepul tree in the centre of the great city of Poonah I have seen hundreds suspended. Although often seen on wing during the day, it is at dusk they are more generally observed, flying at great elevations with an easy sailing motion, broken now and then by the slow and regular flaps of their long wings. At sunset they converge towards the orchards and groves of mango trees, where they commit great havoc on their fruit. Not seen in the Punjab or Himalayas.

5. *TIGRIS REGALIS*, Gray.—*Felis tigris*, Linn.

Plentiful on the western frontier of the Punjab and banks of the Indus and Jhelum. Now scarce in many parts of the Deccan; occasionally seen near Poonah. A few stray along the base of the Himalayas as far as Attock on the Indus, and in the jungles of the Salt Range; but it seldom frequents the Himalayan Valleys, although individuals at times wander a considerable distance inwards. One was killed at Poonch among the southern Cashmere Ranges.

6. *LEOPARDUS VARIUS*, Gray.—*Felis pardus* (Linn.).

Called Chetah, Sher (names applied likewise to the Tiger and all the larger species of the genus), Bagh, &c. by the natives of the Himalayas, where it is pretty common, frequenting dense jungles or forests; preys chiefly on musk-deer or domestic animals, such as sheep, dogs, goats, &c. The presence of a Chetah is often discovered by the barking of foxes, the loud bellowing of the Cashmere stag, harsh cries of the bulbuls and beautiful long-tailed pie (*Pica erythrorhyncha*). This is the most common species found on the lower ranges of the Western Himalayas. It appears however, if not subject to great variety, there are yet species undiscovered. The natives of various districts speak with confidence in regard to species very different in appearance; and I see no reason to doubt the authenticity of their various accounts. I shall give them as recorded in my "notes," written on different occasions. It would seem, the species are confined to localities where their particular description of prey abounds. Thus I have heard of the Burrel hay found at high elevations; this species preys chiefly on Burrel (*Pseudois Nahoar*, Hodgson) and Musk-deer. Colour, a dirty white with black spots.

This is probably the *Leopardus uncia* found on the northern ranges of Cashmere and in Ladakh; skins are brought from Afghanistan and sold in the bazars at Peshawur. On the lower Himalayan Ranges the natives mention a Panther closely allied to the *F. pardus*, but of smaller size, called Adeer hay, which they say is common. Not having seen this animal, I am unable to say whether it is a variety or another species. A Leopard which preys chiefly on Goral (*Nemorhedus goral*), called Goral hay, is said likewise to frequent certain districts of the middle ranges; much smaller than the last, and of a light fawn colour. Altogether my information on this subject refers to five different sorts of Chetah:—

1st. The BAGH, or, as it is sometimes called, Bay herra (*Leopardus varius*; *Felis pardus*, Linn.).

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2nd. BURREL HAY, probably *Leopardus uncia*.

3rd. A Leopard without spots, found in Tibet and Chinese Tartary. The description given me of this animal was very meagre.

4th. The ADEER HAY, probably only a variety of the *Leopardus varius*. Its head is said to be much like that of a bull-dog.

5th. GORAL HAY. A small sort; might be one of the Tiger Cats.

7. *LEOPARDUS HORSFIELDI* (Gray).

This species I once examined; it was killed near Simla; the natives said they are not uncommon on the ranges around that station. Kills partridges and pheasants.

8. *LEOPARDUS TORQUATUS*, Fred. Cuv.

Very common at Poonah in the Deccan,

9. *LEOPARDUS BENGALENSIS* (Desm. sp.).

The common Jungle Cat of the plains of India and lower Himalayan Ranges, I have often thought identical with the last.

10. *CHAUS LIBYCUS*, Gray.—*Felis chaus* (Guld. sp.).

I killed a fine specimen of this species near Rawul Pindee; it is pretty common in the Punjab, and preys chiefly on domestic poultry, rats, and mice.

11. *HYÆNA STRIATA*, Zimmermann.

Very generally distributed over the Deccan, Scinde, and Punjab, and on the lower Himalayan Ranges. It prowls about the stations at night, and is very destructive to poultry; kills likewise sheep and dogs. Not seen in the Valley of Cashmere.

12. *CUON PRIMÆVUS*, Hodgson.

Ram hun of the Cashmerees.

Although not rare on the high ranges of the Western Himalayas, extending northwards beyond even the limits of forest, the *Ram hun* is seldom seen. So cunning and stealthy are its habits, that native sportsmen, long familiar with its depredations, have never seen the animal. When seen, it is generally in packs. A friend informed me he saw a herd of Deer (*Cervus cashmirensis*) pursued by a pack. It appears they pass the day in caves or burrows, and hunt at early morn and in the afternoon. I have frequently followed their trail for miles across the Pinjal Mountains, and even discovered places where they had lain only a few hours before, but on every occasion was unable to discover them. Lieutenant Abbott, 75th Regiment, killed a fine specimen near Allahabad Serai, on the southern ranges of Cashmere, which afterwards proved identical with the specimens of the animal in the Honourable East India Company's Collection in London. It is, however, by no means common on the last-mentioned mountains. Native reports relative to the Wild Dogs of the Western Himalayas are very various, and often contradictory. From the accounts I was enabled to glean

from shikarees and natives resident on the mountains, it appears there is considerable variety in the colour of this species, or that these discrepancies relate to different species. The *Cuon primævus* is bold and ferocious; natives say there are few of the larger quadrupeds they will not attack, and that Ibex, Deer, Burrel, &c., are frequently killed by them.

Note.—In a collection of skins brought from the Kara Korum Mountains in the north of Ladakh by my friend Lieutenant Peyton, 87th Regiment, I saw that of a Wild Dog, probably a new species. The skin was imperfect; and, judging from its length, it appeared the animal was about the size of the Ram hun; nose pointed, hair long and thick, containing much of the under-wool called peshm; prevailing colour *white*, with splashes of black on the back and hips; tail short, somewhat bushy, with the tips of the hairs black. I was informed they are frequently found near the dwellings of the natives, and that they prey on *Caprovis argali*, Nahoor, and Tibet Antelope (*Pantholops hodgsonii*). This may be a species of Wolf; anyhow its existence in Ladakh is very likely unknown, nor have I been enabled to discover any species approaching its description on any part of the Western Himalayas. The Pariah Dog is often forced to depend entirely on its own exertions, and wanders over large tracts of country in the plains of India; but I have not known it do so on the Western Himalayas.

13. CANIS FAMILIARIS, Linn.

a. A domestic variety, resembling in every particular the Shepherds' Dog or Colly, is generally distributed over the western ranges, particularly in Cashmere.

b. A large and formidable breed, of a similar appearance to the last, is raised in the district of Chamba on the Himalayas; but, like many other varieties of hill animals, they pine away and die when brought to the plains of India.

14. CANIS AUREUS, Linn.

Geeder of the natives.

Abundant all over India, Punjab, and lower Himalayan Ranges, including the Vale of Cashmere. In the latter situation, they appear to thrive better and grow to a larger size than anywhere in the plains. There is great reason for thinking it frequently breeds with the Pariah Dog, as I have met with individuals of the latter so like the Jackal, that there was not the slightest point of difference in appearance and habits.

15. CANIS LUPUS, Linn.

Seen occasionally among the ravines of the Punjab, but does not frequent the Himalayas.

16. VULPES BENGALENSIS (Shaw?).

Deccan; Scinde (perhaps the Punjab?).

17. *VULPES PUSILLUS*, Blyth, J. A. S. B. 1854, p. 730.

My specimens agree with the descriptions of the above author, and likewise with *V. leucopus*, Blyth, which I think will turn out only a variety of *V. pusillus*. This Fox is larger than the *V. bengalensis*; and, although common in the Punjab, I did not see it in Scinde or in the Deccan.

18. *VULPES FLAVESCENS*, Gray.

I purchased specimens of this Fox at Leh in Ladakh, and was told by the natives that it is common in the surrounding country. I likewise killed a female and its cub on the Pir Pinjal Ranges of Cashmere, which, on comparison, proved identical with this species. Although larger than the next species, they are similar. At certain seasons of the year the hair is thick, and contains much peshm.

19. *VULPES MONTANUS*, Pearson.

Loh of Cashmere.

Is generally distributed over the lower and middle regions of the western ranges, and never visits the plains. Its favourite haunts are cultivated districts; preys on poultry, Partridges, Pheasants, &c.

Note.—In the Vale of Cashmere, among the ravines, a Fox is common, larger than the *V. montanus*, and of a lighter colour; it burrows in the sides of the little sand banks (called kirawas). It is known to the natives by the name of "Shawul," to distinguish it from the "Loh," which they say is another species. I have seen the Loh on the surrounding mountains, but never in the valley. I was unfortunate in not obtaining a specimen of the Shawul, although I saw many. It preys on poultry, &c.

20. *HERPESTES GRISEUS* (Geoff.).

Deccan; Scinde; Punjab. Pretty common.

21. *HERPESTES NYULA*, Hodgson.

Afghanistan; neighbourhood of Peshawur: easily domesticated, and has been known to breed with the last species.

22. *MARTES FLAVIGULA* (Bodd.).

Lower and middle regions of the Western Himalayas. Common; is easily domesticated, and may be taught to follow its master like a dog. When moving about, it is constantly uttering a low chuckle, which is prolonged into a harsh cry when the animal is excited; very active and playful in the tame state. Its food consists of poultry, eggs, Partridges, and Pheasants. A tame specimen in my possession used to hunt after Snakes and Lizards, which it devoured greedily. The summer and winter dress varies considerably, being much lighter in colour during the latter season, while the dark robe of midsummer so much resembles that of the *M. gwatkinsii*, that I doubt if one could easily tell the difference at that season.

23. *MARTES ABIETUM*, Ray.

Skins of this species are brought from Afghanistan, and sold in the bazars of Peshawur: the dealers have informed me the animal is a native of the mountainous parts of that country. I have not seen it on the Himalayas.

24. *MUSTELA SUBHEMACHALANA* (Hodgson).

I killed a fine specimen of this elegant species in the Valley of Cashmere, close to a farm-yard; the natives said it commits great depredations among their poultry and eggs.

25. *MUSTELA ERMINEA*, Linn.

Found in several districts on the lower and middle regions of the Western Himalayas.

26. *URSUS ISABELLINUS*, Horsf.

Brown and White Bear of Europeans.

Reech, *Baloo* of the natives of the western Himalayan Ranges.

Harpot of the Cashmerees, where it is likewise known as the *Reech* and *Baloo*.

The distribution of this species on the Western Himalayas is not so general as in the case of the Black Bear (*Helarctos tibetanus*). A few are found at the sources of the Ganges and Jumna, but none in Little Tibet. Their head quarters are among the mountains and little valleys north-west of the Vale of Cashmere, where, until within the last few years, they were extremely common. In the Valley of Wurdwun, about six miles long, and not more than one in breadth, situated among the ranges north of Islamabad, Brown Bears were so abundant, that as many as thirty were killed during the spring of 1851 by one individual. They are now almost extinct in these regions, owing to the numbers of European sportsmen annually visiting Cashmere. In size, this species is larger than the next. The largest male, out of many hundreds I have examined, measured 7 feet 6 inches from snout to tail; height 3 feet 5 inches; round the body (behind the shoulders) 58½ inches; round the arm 24 inches; ditto thigh 37 inches. The Brown Bear prefers high and rugged mountains near the confines of persistent snow; and nowhere is his fancy in this respect better gratified than among the noble mountains and valleys of the Cashmere Ranges.

During winter they repair to caves in inaccessible rocks, and there form beds of decayed plants (usually ferns), on which they lie until spring, when, as soon as the snow melts and vegetation appears, they issue from their retreats. They are then very lean and voracious, and will attack sheep or goats; even ponies are said to have been killed by them. The fur in winter and spring is thick, long, and shaggy, but becomes thinner and darker in colour as the season advances; so that towards autumn the under fur has disappeared, and the white collar on the chest (indistinct in the winter garb) is now very visible. This has doubtless given rise to the many mis-

takes regarding different species of Brown Bears. The shades of colour vary much. I observed that the bears seen in spring were always lighter in colour than in autumn; and occasionally an almost white variety was to be met with, and various shades, from a dirty brownish white to a dark brown. Many of the old males were very dark brown, and several females a lighter brown; but I found that these varieties were not dependent on age or sex. It is difficult to say what Brown Bears will not eat; however, it appears they prefer vegetable to animal food. Tender roots and shoots of plants, fruits, flesh of Ibex (killed by avalanches), Deer, Cattle, &c., are greedily devoured by them. One was killed by a friend of mine feeding on the carcass of a Cashmere Deer, which it had evidently surprised and killed when bringing forth young, as a new-born calf lay close beside the mother. During spring, shortly after leaving their higher resting-places, they seldom roam any distance from their retreats, and feed on the grassy slopes close to the melting snow, on which they are fond of lying during the heat of the day. As the season advances, they increase in bulk, and become very fat by the end of October, particularly after feeding on walnuts and apples. They are very fond of a description of small white carrot, abundant in shady ravines, and the roots of the wild strawberry, which they tear up with their fore paws. This Bear is by no means so expert at climbing as its Black congener, and consequently is seldom seen in trees. The she-bear appears in spring with one or two cubs, and rarely three; the latter, when caught very young, are easily domesticated, and become harmless and playful; indeed the old ones are far from being ferocious, and, unless when severely wounded and hard pressed, never attempt to charge their pursuers. Its eyesight is bad; and the sportsman usually finds he can approach within a few yards, provided the wind is favourable; but if otherwise, their acute sense of smell will enable them to discover danger a long way off.

27. *HELARCTOS TIBETANUS* (F. Cuv.).

Black Bear of Europeans.

The native names are the same as those mentioned above for the Brown Bear. To the best of my knowledge, this species is not found in Tibet; anyhow, the name has not been well selected, as the species is generally distributed over the lower ranges of the Western Himalayas. Unlike the *U. isabellinus*, it does not hibernate, and prefers the wooded mountain-sides of the lower chains to the high and bare slopes of the interior. Its favourite resort in summer is among thick jungle, near fields of Indian corn or vineyards, where it commits great depredations during the grain and fruit seasons, devouring tender shoots of plants, wild rhubarb, bark of trees, apples, grapes, walnuts, and Indian corn. Natives allege they sometimes eat flesh and kill sheep; but this must only be when hard pressed for food, as the species is eminently a vegetable feeder. They are expert climbers, and during the fruit season in the Vale of

Cashmere mount to the topmost branches of the walnut and mulberry trees. Whole crops of Indian corn have been completely destroyed in one night by these unwelcome intruders. The farmers build raised platforms in their fields, on which watchmen sit all night and keep up a continual screaming in order to frighten them away. The bears retire from feeding at daybreak, and pass the day in sleep among the dense jungles, repairing to their feeding-grounds at dusk. Although not generally confined to one locality, I have known individuals of both this and the brown species choose some rocky ridge near a spring, where they remain for years, moving up and down the same pathway until a deep stair-like track has been made by their treading always in the same foot-prints. When the two species meet, the Brown is almost invariably the first to turn tail; it is therefore seldom they are seen near one another. It was only in Cashmere that I ever saw the two together. Natives say, during autumn, when the two species repair to jungles to feed on wild apples and walnuts, as the Brown Bear cannot climb, he waits until the other has ascended, and then feeds on the walnuts knocked down by the Black Bear. Both these species possess great powers of smell; indeed it would appear their security from danger is almost alone dependent on this sense, as their eyesight is by no means good. A bear will discover the presence of the hunter fully a mile off, if the wind is favourable. Should he have cause of suspicion, the bear commences to snuff the air, looks excited, walks a few steps in the direction from which the wind blows, raising his head and moving it from side to side until satisfied of the danger; he then turns tail and scampers up the mountain-side at a rapidity few who have seen the animal in confinement would imagine it capable of. There are many instances of this species having attacked both natives and Europeans when approached suddenly in thick jungle. If frightened on a steep mountain-side, it often coils itself in the form of a ball, and rolls down the declivity. I have seen one in this way roll down a hill side for upwards of 300 yards without stopping. The young are born in spring, and remain with the parent during summer. One is the general produce; but not unfrequently two or even three are born on one litter.

Note.—On the ranges near the plains of the Punjab a Bear is found rather smaller than the above; its fur is longer, and that on the paws and snout of a rust-colour. This may only be a variety; but the distinctions stated are worthy of attention. I have seen several skins; and all were marked as I have described; and I find in the 'Calcutta Sporting Review' for September 1848, a similar remark by "Mountaineer" (the well-known and observant Mr. Wilson, of Mussouree), who likewise says that a species with a white mark on the forehead is spoken of by the natives of a district near Mussouree; but from my own personal experience and the information I have received from native and European sportsmen on the Himalayas, I have hitherto been able to discover only the two decidedly distinct species here mentioned. The varieties in regard to shades of colour have doubtless caused many to assert that there are two or

more species of Brown Bears ; but I repeat, and I think it is the experience likewise of those who are conversant with the habits, &c. of the *U. isabellinus*, that these varieties are merely casual, and not even dependent, in every instance, on age or sex. In 'Vigne's Travels in Cashmere,' he says, "The female Brown Bear can be distinguished from the male by colour;" this, as I have shown, is not the case, the only difference being that the male is the larger.

The *Ursus labiatus* does not frequent the W. Himalayas, the Punjab, or Scinde.

28. *ERINACEUS COLLARIS*, Gray.

Deccan ; Scinde ; Punjab, and lower Himalayan Ranges : common.

29. *MUS BANDICOTA*, Bechst.

Although common at Poonah in the Deccan, I never saw this species in the Himalayas or Punjab, nor do I think it is found in these regions.

30. *HYSTRIX LEUCURUS*, Sykes.

Scinde, particularly on the banks of the Indus, Punjab, Himalayas, and Vale of Cashmere. Not uncommon. Much prized, both by natives and Europeans, as an article of food.

31. *LEPUS NIGRICOLLIS*, Fr. Cuv.

Scinde ; Deccan ; Punjab ; not the Himalayas.

32. *LEPUS MACROTUS* (Hodgson).

On the plains of the Punjab, along the base of the Himalayan Chain. It extends up the valleys of the lesser ranges for some distance. There are no hares in the Vale of Cashmere, although the country is very inviting.

33. *LEPUS OIOSTOLUS* (Hodgs.).

Ladakh : around the fresh- and salt-water lakes abundant ; burrows or secretes itself under rocks.

34. *LAGOMYS ROYLEI*, Ogilby.

Common in particular localities on the Western Himalayas, and nowhere more abundant than on the steep and rugged mountains of Cashmere. It is likewise common on the Choor Mountain, near Simla.

35. *LAGOMYS*, sp. ?

Plentiful in Ladakh.

36. *GERBILLUS INDICUS* (Hardw.).

Common in the Deccan, Scinde, and Punjab.

37. *SCIURUS PALMARUM*, Linn.

Deccan, Scinde, and Punjab.

Note.—I saw, on two occasions, in the dense pine forests of Cashmere, a Squirrel very like the *S. vulgaris*, I believe, found in Afghanistan.

38. *ARCTOMYS BOBAC*, Schreb.

"*Drun*" of Cashmere.

Red Marmot of Europeans.

Is confined to localities at high altitudes on the W. Himalayas, and prefers fertile and secluded situations, where vegetation returns rapidly and is luxuriant. There this active creature spends the summer months, surrounded by a plentiful supply of food, until forced to its burrow by the snows of winter. In habits they are social, and form their burrows in gentle slopes, or under stones, on which they delight to sit, and, on the approach of danger, emit a loud wailing cry, which is repeated by the others. In this way a continuous wailing is heard for miles along these solitary mountainsides. On the approach of danger, or after the wailing is over, it darts into its burrow. The favourite food of the species consists of roots and plants, which it would appear they store up for winter, seeing that they hibernate for 4 or 5 months, and in some localities for a longer period. It is seldom they are found at any great distance from their burrows; they delight in sitting erect on their haunches at the entrances. During progression they leap, at times running a few steps, using the tail to assist them. The Bearded Vulture is a formidable enemy to this and the next species. The valley of the Dras River, Ladakh, Wurdwun Pass, Cashmere, and at elevations on the neighbouring ranges, from 8000 to 10,000 feet above the level of the sea, are localities where they abound.

39. *ARCTOMYS TIBETANUS*, Hodgson.

White Marmot of Europeans.

On the plains of Rupshoo Ladakh this species is common, and frequents suchlike situations as the last, but at higher elevations and in a more barren country. I never saw it under an elevation of 12,000 feet, and often on ridges from 16,000 to 17,000 feet above the level of the sea. It prefers the bleak and barren mountains of the interior to the fertile valleys of the southern ranges. It is larger than the last species. Colour a dirty yellowish-white, with the tips of the hairs black.

40. *PANTHOLOPS HODGSONI* (Abel).

"*Sous*" of the natives bordering on Chinese Tartary.

Tibet Antelope of Europeans.

Found on the borders of Chinese Tartary, N.E. of Almorah, and in the northern parts of Nobra Ladakh, where it is called *Sous* by the natives, who say it is abundant on the mountains beyond Yarkund. This fine, handsome creature wanders in large herds among the bare and almost pastureless wastes of Nobra, where, in the summer of 1854, my friend Lieutenant Peyton, 87th Fusileers, killed up-

wards of fifteen fine males. I measured the horns of twelve of his largest specimens; the longest horn was 27 inches in length. It is worthy of remark, that in many of the above-mentioned specimens clusters of the larvæ of an insect, enveloped in cocoons of the size of a sparrow's egg, were found under the skin on the back and hind quarters. This did not seem to interfere with the health of the animal, as all the species he killed were fat and in good condition.

41. *TRAGOPS BENNETTI* (Sykes).

Ravine Deer of Europeans.

Common in the Punjab, particularly on the Salt and Suliman Ranges. Seen often in small herds. Does not frequent the Himalayas westward of the Jumna.

42. *ANTILOPE BEZOARTICA* (Aldrov.).

Common Antelope.

Black Buck of Europeans.

Common in certain parts of the Punjab; more so in the Cis-Sutledge States. Deccan common.

43. *TETRACERUS QUADRICORNIS* (Blainv.).

Four-horned Antelope.

Dyrah Doon. Not seen in the Punjab. A few are found in the tiger jungles on the western frontier of the latter country.

44. *CAPRICORNIS BUBALINA* (Hodgson).

Called *Ramoo* in Cashmere.

Seerow in various other parts of the Himalayas.

The *Ramoo* is perhaps the least common of all the Ruminants frequenting the Western Himalayas. Solitary in its habits, it lives in dense jungles or secluded patches of forest, among rocks, where it moves about stealthily, and may remain for months in one locality. Its proximity is easily discovered by the heaps of dung on its accustomed tracks leading to its feeding-grounds. It is a stupid, awkward, and clumsy animal. When discovered, it usually stands and gazes at the intruder, and, unless wounded, is not even scared by the report of a rifle. Its thick hide is almost ball-proof; and instances have occurred of its making its escape with several bullets in its body. A charge of shot fired within a yard of one was found flattened under the hide (*vide* 'Calcutta Sporting Review' for September 1848).

Both sexes are alike; the length of the horn is from 8 to 10 inches. The beautiful colouring of the skin, composed of long stiff hair, black on the neck, with rufous splashes on the body, render it a valuable trophy in a sportsman's collection. When wounded and brought to bay, they fight desperately, and use their short and pointed horns against the attacks of wild dogs, which natives say are often killed by them when a pack attacks an infu-

riated Serou. The female brings forth in May or June. There is never more, I believe, than one kid at a birth.

45. *NEMORHEDUS GORAL* (Hardw.).

Goral of the Paharees of the lower Himalayan Ranges.

Called *Pijur* by the Cashmerees.

Inhabits the lower and middle regions of the Western Himalayas. Very common in the neighbourhood of Mussouree and Nanythal. Steep rugged hills covered with grass, and craggy, are its favourite resorts. It seldom seeks the shelter of the forest, and, like the Chamois of the Alps, delights in sporting among rocks and precipices. When alarmed, it utters a loud hissing snort, and dashes with surprising rapidity over the most dangerous and difficult places. Gregarious. The horns of the female are shorter than those of the male; otherwise the sexes are very much alike. A few frequent the Pir Pinjal Ranges of Cashmere, and on the lower hills forming the N.W. frontier of the Punjab.

46. *PROCAPRA PICTICAUDA*, Hodgson.

Tibet Ravine Deer of Europeans.

Found on the mountains around Leh, and ranges in the neighbourhood of the lakes of Ladakh. Seen in small herds. Habits much like those of the preceding species.

47. *PORTAX TRAGOCAMELUS* (Pallas).

Nylghau.

By no means common in the Punjab, although plentiful in Lower Bengal; and I scarcely think is ever seen in the country north of Lahore.

48. *HEMITRAGUS JEMLAICUS* (Ham. Smith).

Tare of the natives of the W. Himalayas generally.

Jugla of the Cashmerees.

Kras of the natives around Khistewar.

Common on the Pir Pinjal Ranges of Cashmere, but more so on the mountains near the banks of the Chenab at Khistewar. Frequently gregarious, and seen feeding with the Markore (*Hircus megaceros*). The horns of the female are small; and she has no mane. The young are of a light-fawn colour, with a black line down the back. Frequents steep rocky mountains, passing the day in forests and shady places.

49. *CAPRA HIMALAYANA*, Hodgson.

Skeen and *Kail* of the Cashmerees and natives of various parts of the W. Himalayas.

Is found on many of the lofty mountain ranges of the Western Himalayas; the principal localities may be enumerated as follows:—Aserung, Spiti, Kenewour, Chinese Tartary, Cashmere Mountains, and Ladakh. With reference to the latter country, I observed that

the species found there have shorter horns than those found on the ranges immediately north of Cashmere Valley; however, it is doubtful if they differ in any other particular. A specimen of the *Capra sibirica* from the Altai Mountains, seen in the Derby Museum, Liverpool, appears to be identical with the Ladakh variety.

On the high and rugged mountains northward of Cashmere, Ibex are found in large herds, and to the adventurous hunter offer one of the most pleasing, and at the same time exciting pastimes imaginable. My first introduction to a herd of Ibex I take the liberty to transcribe. "I had for days clambered over the dangerous rocks and snow-drifts in anxious search of Ibex; at last a herd was discovered feeding undisturbed on a grassy slope under some craggy cliffs; but as there was no cover sufficient to permit a near approach, and one fine male was standing boldly out on a pinnacle of rock over the spot where the herd was feeding, I was obliged to fire at a long range; and before the echo of the shot was heard, all disappeared among the rocks and crevices above; but in less time than it takes me to describe, every crag and peak seemed alive with Ibex gazing downwards in astonishment; the large male, uppermost of all, standing on the very brink of a precipice, seemed the sentry and leader; all appeared to be guided by his movements; for as soon as he was satisfied of his danger, his loud and shrill whistle resounded through the glen, and, as if by magic, they disappeared among the shattered rocks." During the winter they repair to sheltered and rocky situations, and feed on moss, lichens, bark of trees, and, I have been credibly informed, eat earth at this season. When the snow melts in spring, they move downwards, and feed on the scanty herbage around its margin. A species of *Nardus* seems their favourite food in summer. During winter they are thickly clad with peshmena of a white colour, which, at a distance, gives the animal a piebald appearance. The peshmena of the Ibex is softer and more valuable than that of the Cashmere goat. During summer the under-wool disappears, and the colour changes to a light brown, with a dark line down the back. The horns of the male grow to a very large size; the largest I ever saw measured $48\frac{1}{2}$ inches round the curve; their diameter and size, however, vary much: commonly they taper to a point, and proceed upwards and backwards, with the tips inclining directly downwards; some diverge a good deal, and terminate abruptly, like many of the European specimens.

The average length of a full-grown Cashmere Ibex's horns varies from 28 to 40 inches round the curve. During summer the Ibex ascend as the snow melts, so that by autumn they are only found on the tops of the highest mountains. It is said the males fight during the rutting-season. A native told me he saw two fighting on the brink of a precipice in Kuloo; one lost its footing, and fell, shattered to pieces, hundreds of feet below. Many are yearly killed by falling avalanches; indeed some of the largest horns are found in snow-drifts. It appears the female gestates nine months, and has sometimes two kids, although one is the usual number. The Ibex is the most keen-sighted animal on the Western Himalayas. Native sports-

men have frequently assured me they have little sense of smell, and can be approached down the wind ; but unless the hunter manages to get above the herd, he has not much chance of succeeding in his stalk, as they never anticipate danger from above, and always look downwards when disturbed. The panther, wild-dog, and bearded vulture prey extensively on this species. I killed one of the latter that had the hoof of an Ibex in its stomach.

50. CAPRA CAUCASICA.

Scinde Ibex.

The above name is given to a specimen of this species of Ibex in the British Museum.

It is found in the mountains of Beloochistan, and ranges to the north and west of Scinde.

51. HIRCUS MEGACEROS (Hutton).

Markore (Snake-eater) of the natives of the W. Himalayas and mountains around the Khyber Pass.

Rass of the natives at the sources of the Oxus.

The distribution of this species is somewhat peculiar. It is common on the ranges around the Valley of Peshawur, in Little Tibet, and all down the banks of the Indus as far as Torbela, the Suliman Range, westward of the Punjab as far as Mitenkote, at the junction of the Indus and Sutledge, on the Southern Pinjal, Cashmere, Hindoo Coosh, Afghanistan, Persia, sources of the Oxus, &c. I have not heard of its being found eastward of the river Beas, and scarcely think it ever frequents the eastern ranges of the Himalayas.

No less interesting are the peculiarities in regard to the shape and degree of curvature of the horns. All the males observed by me on the Southern Pinjal, had the horns flattened, with few twists. I killed probably one of the finest males ever procured ; the horn measured in length 52 inches (round the curvatures), and had one perfect and two imperfect twists, while that of old males from the Peshawur and Suliman Mountains were rounded, straight, and twisted like a cork-screw. One pair of horns in the Museum at Kurra-chee, from Herat, resembled, again, the specimens from Cashmere, only more rounded in their configuration, and had fewer twists.

The Peshawur and Suliman specimens were perfectly straight, and rose perpendicularly from the head, while the Cashmere and Herat ones diverged backwards and outwards from the skull. I have examined different skins from nearly all the above-mentioned localities ; and after allowing for the changes produced by seasons, I could not discover any differences worth mentioning. Mr. Blyth thinks this species is only a variety of the *Capra hircus* ; but I cannot agree with him, and am inclined to the opinion, that the Markore is more likely the original of the domestic species, than that the latter should be considered its progenitor.

The Markore is usually found in small herds, in habits closely resembling the Ibex, feeding on steep and rocky mountains, ascend-

ing and descending in accordance with the season. Its summer and winter coat vary a good deal,—the peshmena in winter, as in the Ibex, causing its colour to appear much lighter, while in mid-summer, when this wool has disappeared, it becomes a light-greyish brown. The under parts are white at all seasons. The adult male has all the under surface of the jaws, neck, and chest, covered with long black hair, which reaches as far as the knees in old specimens. The females and young have a short black beard; and the horns of the former are flat, stumpy, and seldom more than 10 inches in length. The largest male I killed stood 11½ hands at the shoulders; however, it is but rarely one has had the good fortune to procure such a magnificent specimen of this truly noble-looking animal.

On the authority of a native sportsman, long accustomed to the habits of the species, I was informed that the Ibex is seldom found on the same ranges with the Markore, and that the two always fight when they meet,—their mode of attack being similar to that of the tame varieties, rearing on their hind legs and striking with the base of the horn on the forehead. It is sometimes seen feeding with the Tare (*Hemitragus jemlaicus*). In regard to their eating serpents (as the name implies), natives, although not able to substantiate the assertion from personal experience, allege that it is the commonly received opinion that they do so.

52. CAPROVIS VIGNEI (Blyth).

1. *Hauriar* of the Punjab.
2. *Kuch* of the Suliman Mountains.
3. *Shapoo* of Ladakh and Tibet.

Like the Markore, this species inhabits countries differing much in appearance and climate. They are plentiful in Ladakh and on the ranges westward of the Indus, Khyber Pass, and Hindoo Coosh. Suliman and Salt Mountains of the Punjab. Not found on the eastern ranges, and probably not eastward of the Beas river. It is said to abound on the mountains of Persia and Western Afghanistan.

There is likewise, as in the last species, considerable diversity in regard to form and size of the horns of specimens from different places, as well as in the size of the animal. This latter, however, may be owing in a great measure to climate. For example, the specimens killed in Ladakh appeared larger than those from the Punjab mountains. The horns of the Ladakh animal had their upper surfaces rounded; and the tips proceeded more inwards than in any other variety observed.

In the Punjab it frequents bleak and barren mountains composed of low ranges, intersected by ravines and dry river-courses, where vegetation is scanty at all seasons, and goats or sheep are seldom driven to pasture. Usually found in small herds. They are fond of salt, and are generally found most abundant in the neighbourhood of the salt mines. Shy and watchful, is difficult to approach, and possesses in an eminent degree the senses of sight and smell. It is seldom seen in the daytime, being secreted among

rocks, from whence it issues at dusk to feed in the fields and valleys, returning to its retreats at daybreak.

When suddenly alarmed, the males give a loud shrill whistle like the Ibex, which is an invariable signal for the departure of the herd, which keeps moving all the rest of the day until dusk. Their bleat is like that of the tame species; and the males fight in the same way: but the form of the body and infraorbital glands simulate the Deer; hence it is often called the "Deer Sheep." It equals the Deer in speed and activity.

The female gestates seven months. The rutting-season is in September. The young are often caught, but are difficult to rear. I attempted to rear several; and although they became very tame, and took to a she-goat, all eventually died of a distemper accompanied by a discharge from the nose and cough. The lungs were found, after death, in an inflamed state, in fact, well-marked cases of acute pneumonia; with care, however, they can be domesticated; and I have seen them become as docile and tame as any of the domestic varieties. The males, however, are apt to become pugnacious and unmanageable.

53. *CAPROVIS ARGALI* (Pallas).

Nu ang of the Ladakees and Tibetians.

The borders of Ladakh towards the north, and its lakes, may be said to be the most southern limits of this species, and these only in winter and spring. A few are met with at the sources of the Ganges. Large herds wander over the mountains around Yarkund and north of Nobra. I was told by a friend, who had shot many in the latter country, that in all his experience of Himalayan shooting, he had never beheld a more interesting sight than when viewing a herd of some twenty of these noble-looking animals dashing past him, led by a fine old male, which he killed, and whose horns measured 3 feet 2 inches round the curve, and 1 foot 6 inches round its greatest circumference. The horns of the female are flat, narrow, and curve backwards, the length being seldom more than 18 inches.

54. *OVIS ARIES*, Linn.

Var. Hunniah Sheep.

Black-faced Sheep of Ladakh.

Plains of Roopshoo Ladakh, where herds of these animals are reared by the nomadic races of Tartars. The 4-horned varieties are not uncommon. Variety Dumba, or Cabool Dumba, is met with in Peshawur and N.W. frontier districts of the Punjab. Common.

55. *PSEUDOIS NAHÖÖR*, Hodgson.

1. *Sná* of Tibet.

2. *Naboo* of Ladakh.

3. *Burrel* of Europeans and natives.

Is found in Ladakh, Nobra, and Great Tibet. Seems confined to those countries on the Western Ranges. Judging from the great

numbers of horns I found in the cairns in Roopshoo Ladakh, it would appear that the animal abounds in that country, although I seldom saw it during my travels, and was unfortunate in not procuring a specimen. The horns of individuals from different regions differ much in size and curvature. This induced Mr. Blyth to consider the Burrel found in the Borendo Pass as forming a distinct species (*vide* P. Z. S. 1840, p. 68; *Ann. Nat. Hist.* 1841, vol. vii. p. 249).

56. *MOSCHUS MOSCHIFERUS* (Linn.).

Custuree of Cashmere, where it is likewise known by the name "Russ."

Generally distributed over the middle and lower regions of the Western Himalayas, never found on the plains of India. The habits of this species resemble the Ramoo in some respects; only the former is much more common. Never seen in herds, and seldom more than two together. Being in great request on account of its musk, it is surprising the little creature is not more uncommon. During autumn, and when rutting, the musk is strong and most eagerly sought after; but in summer I could not discover, beyond a rank offensive odour from the dark pigmentary substance which the bag contains, even the trace of musk when the contents were tested by smell.

The *Custuree* frequents mountain-sides, where grassy ridges alternate with little belts of forest or dense jungle. In the latter it secretes itself by day, and at dusk or in the morning moves silently across the bare ridges to feed. Its mode of progression is performed by a series of jerking leaps, now and then stopping to reconnoitre, or, having advanced a few steps, continues these fantastic-looking movements. They are by no means shy, and seldom run any distance when disturbed; if chased into jungle, they seek the densest part, and secrete themselves. They are never heard to utter any sort of cry, even in the rutting-season, unless caught, when they emit a series of loud and harsh screams. Its foot-prints are very distinctive; for, in addition, the two long hind toes form impressions which at once betray its presence: in this way it is seldom difficult to discover an individual, if the track is fresh; for it is fond of remaining in one locality, and, like the Ramoo, dungs daily on the same spots. There is considerable diversity in regard to the colour of individuals,—so much so, that a casual observer seeing only skins would be apt to conclude that there are many species; but having observed closely these differences, I conclude they are owing chiefly to age and the nature of the localities they frequent. Indeed it is seldom one finds two skins entirely alike. Some are very dark on the upper parts, with black splashes on the back and hips; under parts white, or a dirty white. Others are of a yellowish-white all over the upper parts, with the belly and inner sides of the thighs white*. A brownish-black variety is common. Not a few had white

* I have not been able to compare this variety with *M. leucogaster*, said to be found in Ladakh, which is doubtful, as I do not think any species of Musk Deer is found in Ladakh proper.

spots arranged longitudinally on the back ; the latter, I found, were young, as all the males marked in this way had short canine teeth.

The canine teeth of the male are from 2 to 3 inches in length (rudimentary in the female). The use of these organs, unless for defence, I have not been able to discover. The natives say they are used to dig up the roots of plants ; then why are they so slightly developed in the female ? The males attempt to use them when caught. I was informed by native sportsmen, that during copulation the male seizes the female by the ears ; and in many instances I have found females with the ears slit or part wanting, I fancy, caused by the sharp teeth of the male. A spotted fawn is born in April, which remains but a short period with the parent. Bearded Vultures, Eagles, Chetahs, and Leopards destroy numbers of old and young ; and they are frequently found buried in avalanches.

57. *POEPHAGUS GRUNNIENS* (Linn.).

A few are found during winter on the southern slopes of the Kara Korum Mountains, Nobra ; but they move northwards towards Chinese Tartary as the snows melt in spring, where they are said to abound. Two fine males were killed by Lieutenant Peyton, 87th Fusiliers, in March 1854, in the first-mentioned district. One of his trophies measured, round the curve of the horn, 2 feet 4½ inches ; greatest circumference, 1 foot ; span between the points, 1 foot 8 inches. This may be considered a fair average of the dimensions of a male's horns. The same varieties will not live out of their native country ; all the specimens brought southward died shortly after arrival in the Vale of Cashmere.

58. *CERVUS CASHMERIENSIS* (Falconer, MSS.), Gray, Cat. Ung. Furc. B. M. p. 199.

Barra Singa and *Hauglu* of the Cashmerees.

May be identical with *C. wallichii* (Cuv.) of the Nepal forests ; however, I have not had an opportunity of instituting a comparison between the two. The Cashmere forests seem the head quarters of this species on the Western Ranges ; for it is seldom if ever met with between Mussouree and the Vale of Cashmere. The dense forests and fertile valleys of the latter country are particularly inviting to this species. In habits and general appearance the Cashmere Stag bears a striking resemblance to the Red Deer. Although it is seldom now-a-days that individuals of the latter species escape the hunter so long as to attain the size and magnitude of the Barra Singa, yet I think it will be found that the horns of those killed in the forests of Scotland in former years are equal in size to any at present met with in Cashmere. It is in the dense pine forests on the Northern Pinjal, and in the many beautiful valleys among these ranges, that we find the species most abundant. There are very few on the Southern Ranges. In the secluded depths of these solitudes they lie all day, to issue forth at dusk and feed on the grassy hill-sides, or descend even into the Valley of Cashmere when forced

by the snows of winter. An adult stag averages 13 hands in height. The colour of the coat varies but little in the sexes or with the seasons of the year: dark liver-colour, with reddish patches on the inner sides of the hips; belly and lower parts white, or a dirty white. The male has the hair on the lower surface of the neck long and shaggy (wanting in the female); the horns large, and usually very massive, with from 10 to 15 or more points, according to age: the largest pair of horns I have measured were 4 feet round the curves, with 6 and 7 points. They are shed in March; and the new horn is not completely formed until the end of October, when the rutting-season commences, and the loud bellowings of the stags are heard all over the mountains.

During rigorous winters, they are frequently driven to seek for shelter and food around the villages in the valleys, when many are destroyed by natives, who hunt them with dogs. The Chetah (*Felis pardus*), Wild Dogs, and Bears are said to kill the young. In winter and until the horns are shed, both sexes are found together, generally in large herds. Afterwards they separate, the males roaming about singly, while the females retire to the denser parts of the forests, where they bring forth their young—a spotted calf, which retains its markings until the third or fourth year. The colour of the upper parts of the young specimens is generally more rufous than in the adult, with the spots arranged longitudinally. The species is seldom confined to one locality, but roams from forest to forest, preferring grassy glades alternating with dense forest, where there is a copious supply of water. It is not often seen during the day, and moves about so stealthily, that by moonlight it is difficult to discover its presence when within a few yards of you. It is only during the rutting-season the sportsman is certain of success; as the decayed twigs crackle under his feet, the noble stag, bellowing, approaches towards him in expectation of meeting a rival or mate. In this way I have known many fine males killed in the forests near the Shalimar gardens in the Valley of Cashmere. The contents of the infraorbital cavity are much prized by the natives as a medicine for the cure of a hundred ills.

59. *AXIS MACULATA*, Brookes.

Deyrah Doon, common; but not found in the Punjab, and never on the Western Himalayas.

60. *HYELAPHUS PORCINUS*, Sundev.

Para of natives and Europeans.

In the jungles on banks of the Punjab rivers; Scinde. Common.

61. *CERVULUS VAGINALIS* (Bodd.).

Kakur of the natives on the lower ranges of the Western Himalayas.

“Barking Deer” of Europeans.

Is generally distributed over the lower ranges of the Western

Himalayas, at elevations under 9000 feet, and prefers gentle wooded slopes, oak forests, &c., to bare hill-sides. Although nowhere abundant, as many as twelve are often met with in one small jungle; however, they seldom form societies, and are oftener found singly than otherwise. Stealthy in its habits, it is often met with when least expected; when frightened, like the Musk Deer, it runs for a short distance, only to turn and gaze at the intruder. Its bark is loud and harsh, and commonly heard at dusk or in the morning. When running, I have often heard a clattering sound, evidently caused by the hind and fore feet striking as in horses when they "over-reach."

62. *ASINUS HEMIONUS* (Pallas).

Kiang of Ladakh.

Is common in herds on the plains and mountains around the fresh and salt lakes of Ladakh. Its favourite food appears to consist of a species of *bent* growing abundantly all over the mountains, and a wild *Vicia* having deep-red flowers, also the scanty herbage by the sides of springs and around the lakes. It runs at great speed, and ascends and descends steep mountain-sides with much agility. Timid and wary, when started, it scampers across the plain for some distance, then turns round, advancing a few steps to reconnoitre. A Tartar servant informed me that the young are sometimes caught by the natives of Yarkund, and used as beasts of burden.

The Tangum piebald ponies (Nat. Lib. vol. xii. p. 291) are brought in large numbers to the markets of Leh. Kafilas (droves) laden with brick tea, cloth, &c., are brought from Yarkund, and exchanged for grain with the Cashmere and Kistewar merchants. On the way to Leh, the caravans are not unfrequently overtaken by snow storms, when nearly all perish. In many places the route is only traceable by the bones of horses. This variety is shy and timid, and at first has a strong dislike for Europeans; however, it soon gets accustomed to its new master, and is in great request in the European stations. I have known from £20 to £30 offered for a good Yarkund pony.

63. *SUS SCROFA* (Linn.).

Abundant in the jungles on the banks of the Punjab rivers, and all over the cultivated districts of the Punjab and lower Himalayan Ranges. Very common on the banks of the Indus, and in the Scinde jungles. Very destructive to grain. They feed at night, and destroy the wheat by always eating the tops.

8. ON THE *DYSIDEA PAPILLOSA* OF DR. JOHNSTON.

BY DR. J. E. GRAY, F.R.S., V.P.Z.S., ETC.

(Radiata, Pl. X.)

Dr. G. Johnston, in Magazine of Natural History (vii. 494, f. 60), described and figured an animal which is parasitic on old shells,

under the name of *Spongia suberea*. It is quite distinct from the Sponge described under that name by Montagu; and Dr. Johnston, in the 'History of British Sponges,' refers the animal to the genus *Dysidea*, with doubt, calling it *D. ? papillosa* (Sponges, 109, f. 18, and t. xvi. f. 67). He at the same time expressed a belief that it might be the nidus of some invertebrated animal, probably of a species of *Natica*, and said that it "is nearly allied to the *Alcyonium ocellatum* of Ellis and Solander (Zooph. p. 180, t. 1. f. 6); and it is probable that the two productions are of the same nature, whatever this may be."

Mr. Barlee has sent to the Museum some specimens in spirits and dry, which he collected in 70 fathoms water near Shetland, and which he, after comparing with Mr. Bean's specimen that was described and figured by Dr. Johnston, considers as identical with that species. Mr. Barlee observed that the animal was a Polype; and the examination of these specimens shows that Dr. Johnston's last observation is correct, and that the animal is very nearly allied to *Alcyonium ocellatum*, and, instead of being the nidus of a *Natica* or a Sponge, is a true Zoophyte, in fact, a *Zoanthus* allied to the genus *Mammillifera* of Lesueur, to which the *Alcyonium ocellatum* of Ellis is referred.

The *Zoanthi* have been divided into three genera, according to the manner in which the animals are united:—1. *Zoanthus*, where they are separate, and arise from a cylindrical creeping stem; 2. *Mammillifera*, where they are equally separate, springing from an expanded base; and, 3. *Corticifera*, where the animals are united side by side on an expanded base. Now the specimens described and figured by Dr. Johnston evidently belong to the second of these genera; but the animal described by Mr. Barlee as evidently belongs to quite a different group: they are free; and the stem often develops lateral buds, giving it a more or less branched form; and it is necessary that a new name should be applied to it: I therefore propose to give the name of *Sidisia*, which may be characterized by the emission of buds on the surface of the cylindrical body.

Sidisia barleei, Mr. Barlee observes, "seems to abound on muddy ground both east and north of Brasseley Island, about thirty miles off, and in about 70 or 80 fathoms water. The polype seems generally very active; and I saw no shifting of position of the animals while I had them in the basin, although there might have been some during the night; but I often watched them for half an hour at a time, and perceived no change in position."

As Mr. Holdsworth informs me that he is about to describe another British species of the family which he has in a living state, I have placed some of Mr. Barlee's specimens in his hands, and requested him to describe them at the same time.

I may add that some years ago I had the ends of the siphons of *Cardium aculeatum*, which had been torn off by a dredge, sent me by an eminent British zoologist as a new kind of free *Zoanthus*!

9. ON A LIVING OCTOPUS. BY J. P. G. SMITH, Esq.
IN A LETTER TO DR. GRAY, F.R.S.

"We found a Sea-spider at Goldthorpe Roads, in St. Bride's Bay, which I brought home, and have examined with much interest. Its habits and attitudes are very different from anything I ever saw figured. I enclose a sketch of its appearance when at rest. It seems very well, and shows great objection to be disturbed.

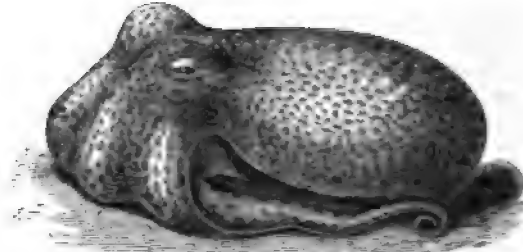
"I noticed that the habit of the Cuttle-fish, when in a large pool on the sands, was to get into a corner formed by a piece of rock, and to fix itself by the suckers of the arms, sac downwards, and that much more flattened and spread out than when lying on the bottom of the vase; the eyes made the apex of an irregular obtuse pyramid. It assumed at times a much darker and richer colour, almost chestnut, mottled with lighter shades; and its skin became more wrinkled; and instead of two inspirations and exhalations in succession, it only made *one* at about the same intervals, but with a much stronger jet of water through the siphon. Upon my return, I placed it in a pitcher of salt water inside the large foot-bath; and while I ran to the sea to fill a vessel with fresh salt water, it had leaped out upon the verandah, and then fallen into the road beneath, by which it was so much injured that it died in the night. After death it became pallid, with scarcely a trace of colour left, and the eyes wide open, round, and black. I felt quite sorry to lose the brute: there was something exceedingly interesting and grotesque about its habits. While in the pool, it walked about occasionally on its arms, with a spider-like movement."

The colour was fawn on the upper side of the body and exterior of the arms, striated with darker hues, making a sort of wrinkly network; beneath and inside the arms it is of an opalescent white: when disturbed or touched, the fawn or reddish-brown colour changes to a pallid-bluish hue. The eyes are very prominent and frog-like: by day they remain nearly closed, with the exception of a narrow slit; but towards night they open wide, and show deep black orbs, with the inside of the eye-lids tipped with gold: the lids and the skin for some little distance beyond are of an intense blood-colour. The animal has the power of extending the area so coloured, which is largest at night time and when disturbed; while at rest it subsides considerably, and the colour does not extend beyond the lids. The arms are eight in number, united at their thicker ends by a web of skin; inside, and to their extremities, are studded with numerous suckers. The belly or sac has a wide valve-like opening beneath each eye, through which the creature inhales water, and then, closing them, drives it out with great force through one or other of the two siphons, which are situated also below the eyes, and close to the valves of the stomach.

While at rest, it coils the arms together beneath the sack-like body, and rests, attached strongly by the suckers in the thick parts of its arms, to the bottom of the vase, the eyes uppermost; and the back, gently expanding and contracting, is bent forward over the arms; at long intervals it draws two deep inspirations, driving out

the water through the siphons with great force. It uses only one siphon at a time; and the two inspirations follow in quick succession.

Fig. 1.



I noticed the intervals of these deep inspirations as follows. R means that the right siphon, and L the left, was used.

	h.	m.	s.
R.....	10	3	15
R.....	10	7	25
R.....	10	10	40
R.....	10	15	0
R.....	10	20	0
L.....	10	25	20
R.....	10	30	15

The appearance of the animal when in this position is wonder-

Fig. 2.



fully like a frog with a very large mouth, the marked division between

the fawn and the whitish colour of the upper and under surface suggesting the idea of the line of the aperture of the mouth (see fig. 1).

It seems to use the right- or left-hand siphon indifferently. The siphons are about $\frac{1}{4}$ rd of an inch in diameter. It has the power of walking or moving about upon its arms. It swims rapidly in a horizontal attitude, elongating the body, and propelling itself with a frog-like motion, by opening and contracting its arms.

When I poured off the water, it discharged at two or three jets through the siphons a small quantity of black fluid, which remained undissolved for some time, in small cobweb-like clouds, floating about on the water. It has the power of contracting the skin above the eyes, so as to make a small horn-like projection; but this only rarely appears. The belly gives you more the idea of a *snout* than anything else. It is about the size of a full-sized Turkey's egg. It walked high, on the tip of its arms (see fig. 2).

10. ON LEPIDOSIREN. BY GENERAL PERRONET THOMPSON,
F.R.S. IN A NOTE TO DR. GRAY, F.R.S.

"Eliot Vale, Nov. 2, 1858.

"MY DEAR SIR,

"In a periodical called the 'Leisure Hour,' No. 357, for Nov. 1, 1858, I find your name in connexion with the *Lepidosiren annectens*, as procured from the Gambia in 1837.

"I was acquainted with the creature in 1810 at Sierra Leone, or more strictly at Banse Island, where the girls used to go and catch it under the name of 'Jumping Fish,' and then eat it; and in June or July 1815, I recognized the same creature, or one very like it, on the mud in or about the fosse of Fort George, Bombay.

"It travels about the wet shiny mud, and appears to be seeking its food. When it chooses, it can jump, in the way that the shrimp does when on shore.

"Of its habits in any other respects I have no information. I apprehend the figure in the 'Leisure Hour' to be very exact. I never saw it larger than the figure.

"Yours very truly,

"J. E. Gray, Esq."

"T. PERRONET THOMPSON."

11. DESCRIPTIONS OF NEW SPECIES OF THE GENUS PALUDOMUS,
FROM CEYLON, IN THE COLLECTION OF HUGH CUMING,
ESQ. BY H. DOHRN.

1. PALUDOMUS HANLEYI. *Testa semiovalis, neritiformis, solida, olivacea unicolor vel saturatius longitudinaliter striata, decussata; spira exserta; anfractus convexi; apertura obliqua, ampla, labio columellari magno, margine interno viz curvato, externo semicirculari; alba vel flavescens. Operc.?*

Long. 18, lat. 15; apert. long. 15, lat. 13 mill.

2. *PALUDOMUS PYRIFORMIS*. *Testa solidiuscula, pyriformis, læte olivacea, striis viridibus brunneisque ornata, decussata; sutura striis aliquot valde impressis circumdata; anfractus 4 convexiusculi, ultimus $\frac{2}{3}$ spiræ subæquans; apertura oblonga, margine columellari arcuato albedo, striis pellucidibus.*
Long. 21, lat. 15; apert. long. 15, lat. $9\frac{1}{4}$ mill.

3. *PALUDOMUS (TANALIA) TORRENTICOLA*. *Testa oblongo-ovata, nigricanti-olivacea, obscure fulgurata et maculata, spiraliter confertim, longitudinaliter rarius striata; spira exserta; anfractus convexi; sutura simplex; apertura ovalis, violacea, margine columellari albo.*

Long. 22, lat. 16; apert. long. 16, lat. 12 mill.

These species are inhabitants of mountain-streams in Ceylon. The specimens which I have got for description being without opercula, I cannot bring them with surety into Mr. Layard's well-established genera of this family.

Zurich, July 1858.

A communication was also read from Surgeon G. C. Wallich, M.D., H.M. Indian Army, describing a new preservative process, the details of which were obtained at Cairo from an Egyptian, by the late Major Sir George Parker of the Bengal Army, and were communicated to Dr. Wallich by that officer at Cawnpore, shortly before the mutinous outbreak, in the course of which the Major's life fell a sacrifice.

November 23, 1858.

Dr. Gray, V.P., F.R.S., in the Chair.

The following papers were read:—

1. NOTICE OF FIVE SPECIES OF BATS IN THE COLLECTION OF L. L. DILLWYN, ESQ., M.P.; COLLECTED IN LABUAN BY MR. JAMES MOTLEY. BY ROBERT F. TOMES.

1. *PTEROPUS HYPOMELANUS*, Temm. Esquiss. Zool. i. p. 61, 1853.

Although the specimen of *Pteropus* included in the collection forwarded to me for examination differs very materially in colour from the ordinary examples of the above species, the distribution of the colours themselves, and the quality and quantity of the fur, together with an absolute similarity in all other respects, including that of size, leave no doubt as to its identity with that species. In colour it more nearly resembles some of the examples of *P. funereus*, a

species, to which it cannot be referred, as it differs greatly, among other respects, in the form and size of its ears*.

Instead of the usual light rufous on the nape and shoulders observable in the ordinary examples of *P. hypomelanus*, the specimen from Labuan has these parts of a purplish-brown, strongly tinged with claret-colour; the fur of the back is also darker; and the under parts, instead of being light reddish-brown, have the same dark-purplish colour as the back of the neck, but less bright.

I have compared the specimen with others from Ternate and from Macassar, the latter having been collected by Mr. Wallace. The comparatively short and rounded ears will at once distinguish the dark variety of this species from *P. funereus*, in which they are longer and more pointed.

2. *PACHYSOMA BREVICAUDATUM*, Is. Geoff.—*Vesp. marginatus*, Hamilton?—*Pteropus marginatus*, Horsf.—*Pt. marginatus*, *Pachysoma marginatum*, and *Pachysoma brevicaudatum*, Temm.—*Cynopterus marginatus* and *C. horsfieldii*, Gray.

Of this species two specimens appear in the collection, both having the bright-rufous hair on the sides of the neck which characterizes the variety which has been called by Dr. Gray *Cynopterus Horsfieldii*. This vivid colouring occurs most frequently in the Ceylon specimens. After comparing a considerable number from various localities, with the type specimens of *P. brevicaudatum* in the Paris Museum, I have arrived at the conclusion that all the above species, given as synonyms, are referable to it.

3. *PHYLLORRHINA LABUANENSIS*, n. s.

I have hitherto seen but one specimen of Horse-shoe Bat resembling the one from Labuan; and that was obtained at Sarawak by Mr. Wallace. Amongst all the descriptions of Asiatic *Rhinolophidae* which I have been able to examine, I have not hitherto met with one which applies to this species; and I therefore regard it as new, and describe it as follows:—

Facial crests, so far as can be ascertained from the inspection of dried specimens, very much like those of *Phyllorhina speoris*. Upper incisors rather broad and almost contiguous; in *P. speoris* they are narrow, and have a considerable central opening. Lower incisors small, very regular, and trilobed; canines, above and below, rather long and slender. Ears of medium size, as broad as high, pointed, and the outer margin very faintly hollowed out towards the tip.

The wings are rather long and narrow, the fourth finger not exceeding in length the two basal phalanges of the longest finger. Thumb short, more than half enveloped in membrane.

* All the examples of *P. funereus* which I have examined have had the unworn teeth of young individuals, and moreover exhibited further indications of immaturity, in the broad and flattened longitudinal crest of the cranium: in older examples this becomes prominent and acute. I regard the *P. funereus* as the young of *P. edulis*.

Fur of the upper parts tricoloured, dusky-grey at the base, succeeded by yellowish-brown, and this again by darkish umber-brown, with the extreme tips a little paler. Beneath, the fur is faintly bicoloured, lightish brown at the base, with the tips of the hairs rather paler.

The specimen in my own collection from Sarawak differs in having the colours much more vivid. Fur of the upper parts bright cinnamon-brown for two-thirds of its length, succeeded by bright rufous of a somewhat darker hue, with the extreme tips of the hairs a little paler, giving, when viewed in some lights, a slightly hoary appearance. Beneath, the fur is lightish rufous, a little darker at the root than at the tip. Membranes rather dark and shining.

The following are the dimensions of these specimens:—

	Labuan.		Sarawak.	
Length of the head and body, about ..	2	3	2	2
— of the tail	0	10½		
— of the head	0	9½	0	9½
— of the ears	0	5	0	5½
Breadth of the ears	0	5½	0	6
Length of the fore-arm	1	10	1	9½
— of the longest finger	2	10	2	7
— of the fourth finger	2	1	1	11
— of the thumb and claw	0	3	0	3
— of the tibia	0	8½	0	8
— of the foot and claws	0	4	0	4
Expanse of wings	12	0	11	8

Obs.—The species to which this is most nearly affined is the *Phyllorhina speoris*; but it may be readily distinguished by the following points of difference:—*P. speoris* is constantly somewhat larger than the present species, and has the head, but more especially the canine teeth, considerably larger. The tibiae, too, are not only longer in actual measure, but also longer in relation to the size of the animal, in *P. speoris*, than in the present species. Again, in *P. speoris* the free portion of the thumb is longer than the enclosed part, whilst in the present species the enclosed portion is the longer. To these differences may be added, that the membranes are much less translucent, but more shining, in the Labuan species than in *P. speoris*.

4. SCOTOPHILUS NITIDUS, n. s.

In M. Temminck's monograph of the genus *Vespertilio*, several small Asiatic species are described which are affined to the common Pipistrelle Bat of Europe, and appertaining to the genus *Scotophilus*. They are mostly smaller than that species, but are characterized by the same subgeneric forms. The following are the species alluded to:—*Vesp. brachypterus*, *V. pachypus*, *V. abramus*, and *V. Akokomuli**.

* I do not include the *V. tralatitius* of the same author, because it has been shown by Dr. Gray to be quite a distinct species from the original *V. tralatitius*.

To these may be added the *V. coromandelicus*, F. Cuv., one of the smallest Bats known; and the species I am about to describe must be placed in the same list.

In size it is one of the smallest, appearing but little larger than the *V. coromandelicus*; but on closer examination, is found to be considerably the larger of the two, the slenderness of the bones of the limbs tending to give it an unsubstantial and small appearance.

The head is somewhat more elevated, and the muzzle rather less obtuse than in *S. lobatus* or *S. coromandelicus*; but the ears and tragi are shaped precisely as in those species: viz. the ears are small and ovoid, with the ends rounded, and with scarcely a perceptible emargination at their outer margin; and the tragus is short, of nearly uniform breadth, curved inwards, and round at the end. As in the other species of this group, the wing membranes spring from the base of the toes; and these latter constitute one-half the entire length of the foot. The free portion of the thumb is somewhat longer than that which is enclosed in the membrane. The tip of the tail is free. The bones of the wings and legs are more slender in relation to their length than those of its congeners; and the tibiae are rather longer relatively.

The fur does not anywhere encroach on the membranes, either above or beneath, but is strictly confined to the body; it is of medium length, and thick and silky. That of the upper parts is uncoloured, dark chestnut-brown, without variation of tint on the different parts of the body; beneath bicoloured, dark brown at the base, tipped for a third of its length with reddish-brown, a little paler on the pubes.

Such is the colour of the specimens from Labuan; but two others in my own collection, obtained by Mr. Wallace at Sarawak, have all the upper parts of a dark shining brown, with scarcely a tinge of chestnut; and the under parts have the fur tipped with greyish-brown instead of rufous.

The cranium, in its general conformation, closely resembles that of the *Pipistrelle*, but has the facial portion a little broader. As in that species, there is a rudimentary premolar, immediately behind the upper canine, and placed in a line with the other teeth, so as to be visible from the outside. In *S. tralatitius* the second premolar is contiguous to the canine, and the first or rudimentary one is placed in the angle formed by the two, and is only seen from the inside. But the greatest peculiarity exists in the form and arrangement of

of Dr. Horsfield. It is in fact a true *Vespertilio*, bearing a great resemblance to the *V. mystacinus* of Europe. *V. tenuis*, according to M. Temminck, is so closely allied to it, as to be with difficulty distinguished from it; and we are therefore led to believe that this is a true *Vespertilio* also. The so-called *V. imbricatus* of Temminck answers well to the true *V. tralatitius*, and is, I have no doubt, referable to that species. Of the *V. imbricatus* of Dr. Horsfield I have as yet seen but one example, the type specimen in the Museum at the India House. *V. brachypterus* is most likely the young of *V. tralatitius* of Horsfield. *V. pachypus* is probably a good species; and the same may be said of *V. Ahokomuli*; but M. Temminck's description and figures of *V. abramus* apply so exactly to the *Scotophilus lobatus* of Gray, that it will probably have to be quoted as a synonym of the latter species.

the upper incisors. In the generality of species appertaining to this group, they are arranged in pairs, with a considerable central opening, and the two inner ones somewhat longer than the outer, and more or less in advance of them; but in the present species, the outer ones, adjoining the canines, are more in advance than the inner ones, and are merely rudimentary. The curve which is made by the row of upper incisors has, by this arrangement, its concave surface directed forwards instead of backwards, as in other species.

The number of the teeth may be thus given:—

In. $\frac{2-2}{6}$; Can. $\frac{1-1}{1-1}$; Prem. $\frac{2-2}{2-2}$; Mol. $\frac{2-2}{2-2} = \frac{16}{18}$.

	Labuan.		Sarawak.	
Length of the head and body	"	"	"	"
— of the tail	1	3	1	3
— of the head	0	6	0	6½
— of the ears	0	2½	0	3
— of the tragus	0	1½	0	2
— of the fore-arm	1	2	1	1½
— of the longest finger	2	2	2	3
— of the fourth do.	1	6	1	7
— of the thumb	0	3	0	2½
— of the tibia	0	5½	0	6
— of the foot and claws	0	3½	0	3
Expanse of wings	9	0	8	9

The above are the dimensions of two *adult* individuals from the localities mentioned; younger ones differ in having the *fingers* considerably shorter, and the *fore-arm* a little shorter.

5. SCOTOPHILUS CIRCUMDATUS? *Vespertilio circumdatus*, Temm.

I refer this species, with some doubt, to the *V. circumdatus* of M. Temminck. It agrees with it in most particulars, such as the form of the head and ears, and in having the wing-membranes extend only to the extremity of the tibiæ; but it differs in being somewhat smaller, in having the fur shortish and unicoloured; whereas that of *circumdatus* is, according to M. Temminck, long, and of two colours.

For the present, I prefer leaving it under the name above given, until a greater number of specimens can be examined.

I have to thank Mr. Dillwyn for the opportunity of describing the species mentioned in this paper, and for the great liberality with which he has allowed me to make any use of his specimens which might be desirable for the purpose of description.

2. ON TWO SPECIES OF ANT-BIRDS IN THE COLLECTION OF THE DERBY MUSEUM, AT LIVERPOOL. BY PHILIP LUTLEY SCLATER.

1. MYRMECIZA EXSUL, sp. nov.

Obscure brunneocenti-castanea, cauda concolore; capite toto unidique et corpore infra ad medium ventrem nigris: ventre imo

crisso et hypochondriis dorso concoloribus : alarum tectricibus minoribus nigris ad apicem albo punctatis : campterio albo : rostro nigro, pedibus obscure brunneis : periophthalmio denudato.

Long. tota 5·0, alæ 2·5, caudæ 1·7, rostri a rectu 0·85, tarsi 1·2.

Hab. In isthmo Panama (*Delattre*) et in rep. Nicaragua.

Mus. Derbyano, sp. 4939, et Acad. Philadelph.

This species may be placed between *M. hemimelana* and *M. cinnamomea* in my arrangement. In colouring it somewhat resembles the former, but it is of a much stronger build, and has no white markings in the interscapularies. The bill is shorter than in *M. cinnamomea*, but the form otherwise nearly similar. The single specimen in the Derby Museum is marked with one of Delattre's tickets "Mâle, Panama," and was acquired by the late Lord Derby in 1846. Another example of this same bird, of which I have a note, is in the splendid collection belonging to the Academy of Natural Sciences of Philadelphia. It is labelled '*Nicaragua*.' I took a description of it in the autumn of 1856, but was loath to publish it without seeing a second specimen.

2. *DYSITHAMNUS OLIVACEUS.*

Thamnophilus olivaceus, Tsch. Consp. Av. p. 278, et Faun. Per. p. 174.

Dysithamnus olivaceus, Cab. Orn. Not. i. 223; Bp. Consp. p. 199.

♂. *Olivaceus*: pileo cinerascens, capitis lateribus concoloribus: subtus pallide cinereus; gutture ventre medio et crisso albicantibus: campterio albo: alarum tectricibus albo anguste marginatis.

Long. tota 5·0, alæ 2·5, caudæ 1·7.

Hab. In Bolivia (*Bridges*).

Mus. Derbyano.

A distinct species of *Dysithamnus* nearly allied to *D. mentalis*, but recognizable by the absence of the black ear-mark, and darker colour of the sides below. I did not include it in my Synopsis, not having then met with specimens. The example in the Derby Museum from which I take my characters, was obtained through Mr. Cuming in 1846, and was doubtless among the Bolivian birds collected by Mr. Bridges.

I have to express my acknowledgments of the liberality of the Trustees of the Derby Museum, in allowing me the use of these and several other birds for examination. Without actual comparison of specimens it is nearly hopeless to attempt to determine species of this and other similarly-complicated groups.

3. NOTE ON THE GENUS *CICHOLOPSIS* OF CABANIS.

BY PHILIP LUTLEY SCLATER.

In the second part of the General Report upon the Zoology of the Pacific Railway routes, the sheets of which Prof. Baird has been

kind enough to send me by post, the term *Cichlopsis* of Cabanis is used generically for the *Ptilogonyx nitens* of Swainson. Now I wish to point out, that if this bird is to be constituted a separate genus from *Ptilogonyx cinereus* (for which there seem to be sufficient grounds), Cabanis' name cannot be employed for it, as it is less closely allied to the true type of his genus than to *Ptilogonyx*. The *Cichlopsis* was one of the many rare birds in the Berlin Museum which the late Professor Lichtenstein (whose example in this respect has, I am sorry to say, been followed in several other large collections) thought he had made sufficiently public, by labelling as "*Turdus leucogonyx*." Dr. Cabanis, in his "Museum Heineanum" first shortly indicated the characters of this bird, and rightly assigned it to the neighbourhood of *Myiadestes*, proposing for it the new generic term *Cichlopsis*. But he made the mistake of writing Lichtenstein's MS. name "*leucogonyx*" (taken from its white under mandible) "*leucogenys*," and so caused Prince Bonaparte to fall into the error of considering it to be identical with Tschudi's *Ptilogonyx leucotis*, a very different bird. Prince Bonaparte's somewhat curt description* of "*Myiadestes leucotis*," the third species of his genus *Myiadestes*, as given in the 'Conspectus' (p. 336), is doubtless intended for this species. I first became acquainted with this curious type at Berlin, but was delighted at meeting with it again at Philadelphia in the collection of the Academy of Sciences, as I have already mentioned in these Proceedings†. Lately I have picked up a specimen myself, which from its appearance I should consider to be from Brazil—the locality assigned to it by Lichtenstein. Prince Bonaparte has also described this bird in another place as *Myiocychna ochrata*, and states it to be the type of Dr. Schiffs' MS. generic term *Myiocychna*. Mr. G. R. Gray has, however, given the type of *Myiocychna* as *Turdus flavipes*, Vieill.—a typical Thrush.

The somewhat complicated synonymy of this bird will, therefore, stand as follows :—

Genus CICHLOPSIS.

Cichlopsis, Cab. Mus. Hein. p. 54 (1850).

Myiocychna, Bp. (ex MS. Schiff) Compt. Rend. xxxviii. p. 6 (1854).

CICHLOPSIS LEUCOGONYX†.

Turdus leucogonyx, Licht. in Mus. Berol.

Cichlopsis leucogonyx, Cab. Mus. Hein. p. 54.

Myiadestes leucotis, Bp. Consp. p. 336 (excl. synonym.).

Myiocychna ochrata, Bp. C. R. xxxviii. p. 6, et Notes Orn. p. 30.

"*Turdus brunneus*, Freyreiss," Bp. l. c.

Cinnamomescenti-fusca, gutture medio rufescente; abdomine cano,

* *Fusco-rufa*, abdomine canescente.

† See P.Z.S. 1857, p. 6.

‡ Since writing the above, I believe I have discovered a still earlier synonym of this bird—*Turdampetis lanioides*, Less. Echo d. M. S. 1844, p. 156 = *T. rubrocorys*, Less. Descr. d. Mamm. et Ois. p. 324.

crisso flavicante; rostro superiore nigro, inferiore flavicanti-albo: pedibus fuscis.

Long. tota 8·0, alæ 3·4, caudæ 2·5, tarsi 0·85.

The form is easily distinguishable from *Myiadestes* by its longer, stronger, and thicker bill, the larger size of the spurious primary, the relatively longer second primary, and particularly by the shorter, broader, and more rounded tail.

For the *Ptilogonys nitens* of Swainson, erroneously referred to this genus by Baird, I propose the generic name *Phainopepla* φαεινός, nitidus, et πέπλος, vestis).

4. DESCRIPTION OF A NEW CYRENA AND BULLA. BY SYLVANUS HANLEY, F.L.S., &c.

CYRENA COCHINENSIS. *C. testa cordata, crassa, valde inæquilate obliqua, ventricosa seu tumida, epidermide nitente, nigro-fuscescente vestita, sulcis remotiusculis antice exarata, postice magis minusve lævigata: extremitate lateris antici perbrevis rotundata; lateris postici attenuati productique, in adultis obtusa, in junioribus rotundato-acuminata: margine ventrali arcuato antice valde, postice parum acclivi: natibus obliquis, erosis, prominentibus: lunula nulla, loco ejus autem sulcorum experte: area dorsali postica lata, retusa: superficie interna alba, margine cardinali violaceo sparso, concavitate nonnunquam rubescente, sinu palliari vix ullo: dentibus primariis vix emarginatis; lateralibus haud manifeste striatis, sub lente autem minutissime corrugato-granosis, antico brevi et valde approximato, postico elongato et remotiore.*

Long. $1\frac{1}{2}$; lat. $1\frac{1}{4}$ poll. Hab. Cochin (Ind. Oc.). Mus. Hanley (*M. Andrew*).

A few individuals of this strongly-marked species were sent, in company with some *Velorita*, from the Malabar coast, by my collector, Mr. Winkle. In external aspect the shell somewhat resembles the *V. cyprinoides*; but probably *Balissa* would be selected for its reception by those who differ from me in subdividing the very natural group *Cyrena*: the very minute shagreening of its lateral teeth, however, scarcely answers the definition of that subgenus. The primary teeth are somewhat peculiar, and have a tendency to shelve outwards; the hinder and central ones are not strictly bifid, but exhibit a kind of shallow sublateral grooving; the front one in the right valve is very short, and simply pyramidal. The beaks are probably acute when young; the surface below the epidermis is reddish purple.

BULLA (CYLICHNA) CARPENTERI. *B. testa minuta, cylindrica, brevi, medio subretusa, alba superne et inferne rotundata vixque attenuata, liris gracilibus confertis longitudinalibus, et striis confertioribus exilissimis spiralibus, undique sculpta: umbilico apicali magno, anfractibus spiræ manifestis; labio*

kind enough to send me by post, the term *Cichlopsis* used generically for the *Ptilogonys nitens* of Swainson to point out, that if this bird is to be constituted from *Ptilogonys cinereus* (for which there are grounds), Cabanis' name cannot be employed as closely allied to the true type of his genus. *Cichlopsis* was one of the many rare genera which the late Professor Lichtenstein has, I am sorry to say, been following (his notions) thought he had made " *Turdus leucogonys*." Dr. Cabanis first shortly indicated the change, and it to the neighbourhood of the generic term *Cichlopsis*. Lichtenstein's MS. name (in his mandible) "*leucogonys*" into the error of "*leucogonys leucotis*," a very incorrect description of the genus *Myiadenobolus* and other officers, to whom the great Silver Jubilee has been presented in commemoration of their

ENAGERIE.
E SOCIETY.

curious type of the vessel left Calcutta, eight pairs of Impeyan Pheasants at Phila were landed at Calcutta, eight pairs of Impeyan Pheasants have been formed for Her Majesty's Society, were landed at Calcutta on the "Prince of Wales." by great and liberal exertions on the part of the Earl of Canning, aided by the Duke of Devonshire, Mr. Keene, Capt. James the acting Regent, and other officers, to whom the great Silver Jubilee has been presented in commemoration of their

The agent of the Society, Mr. James Thompson, who had been sent out to take charge of the birds, notwithstanding this serious loss, succeeded in delivering alive and in perfect health four other very interesting species, the results obtained from which have fully equalled my most sanguine expectations as to the reproduction and final acclimatation in Europe of all the gallinaceous birds which are found in the temperate and more elevated zones of the Himalaya.

The birds were brought down to Calcutta and shipped in the beginning of March. Their confinement during the voyage necessarily interrupted the natural period of breeding; but as soon as they were established in the provisional aviary which had been prepared for them, two of the species, *Gallophaps alboeristatus* and *Gallophaps horsfieldii*, paired and began to lay. The eggs of the former were unproductive; but out of ten of the latter, nine birds were hatched, were very skilfully reared by the personal attention of the Superintendent, Mr. John Thompson, and notwithstanding the extreme lateness of the season, were successfully preserved throughout the winter of 1857-58, making strong and fully-developed birds in the following spring.

In the month of April 1858 the whole of the imported birds, having passed the winter with very slight protection, were in full health and vigour, and laid freely. The species were as follows:—



2.



5



4



3

W. West imr

1. *Gallophasis horsfieldi*. 2. *G. melanotus*. 3. *G. albocristatus*.
4. *Catreus wallichii*. 5. *Lophophorus impeyanus*.

WHITE-CRESTED KALEEGE.	<i>Gallophasis albocristatus.</i>
HORSFIELD'S KALEEGE.	<i>G. horsfieldii.</i>
BLACK-BACKED KALEEGE.	<i>G. melanotus.</i>
CHEER.	<i>Catreus wallichii.</i>
IMPEYAN PHEASANT.	<i>Lophophorus impeyanus.</i>

Of the latter bird, specimens had been living in the Menagerie for some time, and eggs had been hatched in 1854 and 1856.

In 1858 the five species above-mentioned produced 184 eggs, from which no less than 126 birds were hatched, and 111 reared. These were, for the most part, disposed of by sale to various members of the Society having facilities for continuing the experiment.

The young birds of the species of *Gallophasis* closely resemble each other, as will be seen on comparing the figures of *G. horsfieldii* and *G. albocristatus* in Plate CXLVIII.

The young of *Lophophorus impeyanus* and of *Catreus wallichii* are now also figured for the first time in Plate CXLVII.

The Cheer is clearly distinguished from the true Pheasant (*Phasianus*), with which it was associated by its first describer, both in form and in the texture and coloration of its plumage. Its carriage when running, its note, and above all the coloration of the egg (Plate CXLIX. fig. 4) are additional confirmations, if any were necessary, of its generic difference. The egg which has been figured is a fair typical example; but there are varieties in which the blotches nearly disappear.

The egg of *Lophophorus* has been frequently sent from India; but authenticated specimens of the three species of Kaleege given in figs. 1, 2, 3 of Plate CXLIX. have not, I believe, been recorded; that of *Gallophasis horsfieldii*, fig. 1, is easily distinguishable by the purplish tint of its ground, which never appears in either of the others.

The perfect hardiness of these English-bred birds has been satisfactorily demonstrated at Hawkestone, as far as the temperature of the past winter would admit of a trial. The Cheer, the Black-backed Kaleege, and the Horsfield's or Purple Kaleege, have lived in an enclosure of two acres without any shelter whatever, except that afforded by the hollies and other evergreens in which they roost; and there is no doubt that, even in the severest weather, that protection will be sufficient for them, as well as for the White-crested Kaleege and the Lophophore.

The present breeding-stock reserved by the Society consists of two pairs of Cheer, two pairs of the Purple Kaleege, two pairs of the White-crested Kaleege, two pairs of the Black-backed Kaleege, and three pairs of the Impeyan Pheasant. If the success of last year is continued, the whole of these species ought to be firmly established in England; and as the state of India will now admit of resumed importations, the *Cerionis*, *Pucrasia*, and *Tetraogallus* ought soon to follow them.

December 14, 1858.

Dr. Gray, F.R.S., V.P., in the Chair.

The following papers were read :—

1. NOTES ON A COLLECTION OF MAMMALIA MADE BY MR. FRASER AT GUALAQUIZA. BY ROBERT F. TOMES.

1. *VESPERTILIO CHILOENSIS*, Waterh.

V. nigricans, Pr. Max. ?

Of this species—the commonest true *Vespertilio* in South American Collections, and occurring also in Mexico—Mr. Fraser has sent home two specimens, one adult and the other young. I entertain but little doubt that this is the Bat called by Prince Maximilian *Vesp. nigricans*. There is no South American species which answers so well to his description as this one, and it is so common that it would hardly have escaped his notice. It occurs in New Granada, Bolivia, Brazil, Chiloe, and Guatemala, to which we must now add Mr. Fraser's locality. In Bolivia it must be exceedingly numerous, Mr. Bridges having sent great numbers thence.

2. *V. VELATUS*, Isid. Geoff. sp.

Plecotus velatus, Isid. Geoff.

Histiotus velatus, P. Gerv.

Although placed in the genus *Plecotus* by M. Isid. Geoffroy, it is simply a *Vespertilio* with large oval ears, entire at their outer margin, as in *V. bechsteinii*, and *V. pallidus*, Le Conte. It appears to me to have none of the peculiarities of *Plecotus*, excepting the size of the ears; and neither do I think it was necessary to establish a new genus for its reception, as we find done in the volume devoted to the description of the species of Mammalia collected during the travels of M. Castelnau.

It is probable that this is the species described by Poepig under the name of *Nycticejus macrotis**.

3. *SCOTOPHILUS FURINALIS*, P. Gerv. sp.

Vespertilio furinalis, P. Gerv. et D'Orb. Voy. Amer. Mérid.

A greater number of this than of any other species of Bat appears in the collection. Hitherto it must have been rare in Museums, as I have met with but one specimen, and that may have been one of those from which the original description was taken, as it was contained in the French National Collection.

4. *MOLOSSUS OBSCURUS*, Geoff. Ann. du Mus. vi.; Temm. Mon. i.

Molossus fuliginosus, Gray, Mag. Zool. Bot. ii.

* Reise in Chili, Peru, &c. 1835.

5. GLOSSOPHAGA ECAUDATA, Geoff. Mem. du Mus. iv. 418.

Anoura geoffroyii, Gray, Mag. Zool. Bot. ii. 490.

Of this species but one specimen has arrived.

6. PHYLLOSTOMA HASTATUM, Geoff.

In Mr. Fraser's letter, published in the 'Zoologist,' the following paragraph appears:—"I note the following, for fear it should be forgotten, and it is well Mr. Tomes should know it: amongst my Gualaquiza specimens will be found one Bat much larger than the rest; the Indian who brought it said it attacks the mules, and is called in their language 'Jichimchama.'"

This species is by far the largest Cheiroptere sent, and answers to the above note also in being a solitary specimen; but the form of the teeth, together with its whole structure, forbids the supposition that it is a blood-sucking creature. If by attacking the mules it were meant that it actually devoured any part of their substance, the statement would have quite as great an appearance of probability, for it is possessed of jaws and teeth of sufficient strength for a carnivorous regimen. Doubtless it is to the following species that the accusation more properly applies, while the larger is allowed the credit of it.

7. DESMODUS RUFUS, Pr. Max.

Desmodus D'Orbigny, Waterh.

One specimen of this species, with the same quantity of cinereous in the fur, which led to the name given above as a synonym, is contained in the collection. If any doubt were to arise as to its capabilities of blood-letting, a mere inspection of the front teeth would alone be quite sufficient to remove it. They are prominent and exceedingly sharp, admirably adapted to such a purpose. I greatly doubt there being more than one species of *Desmodus*: my own collection contains specimens which answer to the specific names, *rufus*, *fuscus*, and *murinus*. They are all similar, excepting in colour; in this they differ very considerably.

8. SACCOPTERYX LEPTURUS, Ill.

Vesp. lepturus, Schreb. Säugeth. i. p. 173. pl. 57.

Taphozous lepturus, Temm. Mon. ii. p. 291.

Of this species the collection contains three examples, of which two are adult, and the other scarcely half-grown. In the older ones the antibrachial membrane is furnished with a sac; but this is wanting in the young one.

9. SCIURUS ÆSTUANS, Linn.

The specimen sent, although no doubt referable to this species, are at the same time a little larger than is common, and have the ears a trifle longer. They are also more strongly tinged with rufous on the under parts. The differences do not appear to me to be sufficient to admit of specific separation.

10. *HESPEROMYS LONGICAUDATUS*, Bennett.

One specimen, differing in no way from the Chilian ones.

11. *H. CEPHALOTES*, Desm. sp.

The collection contains one specimen only, which, on the authority of M. Wagner, I here place in the genus *Hesperomys*. At present I have not sufficiently examined the species to speak with certainty as to its generic pretensions, but may observe that it is amongst those species which Mr. Waterhouse considered as requiring further examination.

12. *H. SQUAMIPES*, Licht. sp.; Wagn. Supp. Schrub. iii. 540.

Mus squamipes, Brants, Muiz. 138; Fisch. Synop. 323.

A male and female of this species, contained in the collection, appear to be similar in size and colour: and of the latter Mr. Fraser has the following note:—"Nose and feet flesh colour, ears darker; taken in a bag of grain in the house; Xivaro name, 'Catipi.'" The specimen differs only from others from Bolivia in having the tail a little shorter.

13. — ? — ?

A single specimen, in skin, from which the skull has been removed, and appears not to have arrived with it. It is most likely a species of *Hesperomys*, of rather large size, approaching that of *H. Cephalotes*, and having very long and soft fur of a deep rufous colour, and a tail considerably longer than the head and body.

14. — — ?

A very young animal, probably of the genus *Hesperomys*.

15. *ECHIMYS CAYENENSIS*, Geoff.

A thickly-spined, and rather large example, apparently somewhat more strongly tinged with rufous than the illustration given by Mr. Waterhouse, or than either of those given by M. Pictet.

16. *DIDELPHYS FUSILLA*, Desm. Mamm. 261.

Four specimens of this diminutive species are contained in the collection, of which one only is adult.

17. *DIDELPHYS* — ?

Only one specimen, which agrees with exactness to the description of a species, given by Mr. Waterhouse, as of doubtful identity with *D. cinerea**. It differs from the latter in having very much longer

* I am fully aware that I am placing a pouched species in that section of the genus which is characterized by a merely rudimentary pouch, or by its entire absence: but the example examined by Mr. Waterhouse was a male, and we know nothing about the pouch. The existence of this part in the present species, and its absence in the one which it otherwise most nearly resembles, is sufficient evidence of the distinctness of the two.

fur, in having the hairy portion at the base of the tail much shorter, and in being altogether somewhat smaller. The following is Mr. Fraser's note on this specimen :—"Had five young in her pouch, each 3 inches long. Nose, chin, and latter half of the tail flesh-coloured; ears black. Stomach contained bones of a small mammal, and a pulp containing vegetable substance. Eyes black. Xivaro name, 'Tinchna.'"

The young ones have the terminal two-thirds of the tail white; but the flesh-coloured "latter half of the tail" in the mother is not now very apparent. From the fact of the pouch containing young ones of considerable size, we may suppose that the animal is adult, and that the differences above-mentioned are not attributable to immaturity. This strengthens the idea of its distinctness as a species, of which I have no doubt, and shall take an early opportunity to say more about it.

2. ON THE BIRDS COLLECTED BY MR. FRASER IN THE VICINITY OF RIOBAMBA, IN THE REPUBLIC OF ECUADOR. BY PHILIP LUTLEY SCLATER.

(Aves, Pl. CXLVI.)

Mr. Fraser arrived at Riobamba from Cuenca in the beginning of June last, and stopped about a month in the neighbourhood, passing again on his return southwards from Quito in August. Riobamba is situated at an elevation of about 10,000 feet above the sea-level on the lofty plateau lying between the bifurcated range of the Andes. It is on the Atlantic water-slope, being placed on an upper branch of the Rio Pastassa, one of the confluent of the Amazon, and is well known as having been the seat of the great earthquake of 1794, which destroyed 30,000 lives, and was, according to Humboldt, "one of the most terrible phenomena which have occurred in the physical history of our globe." Besides collecting at Riobamba itself, Mr. Fraser made expeditions to several places in its vicinity, namely Guano, Pinipi, Matos, Titiacun, and Punin. Guano lies $1\frac{1}{4}$ league N.N.E. of Riobamba, Pinipi 4 leagues N.E. by E., and Matos a little more northwards, a league farther on. Titiacun is a league beyond Chambo, which lies 3 leagues E.S.E. of Riobamba, and is high up on the sides of the Volcano "El Altar." Mr. Fraser says that his shooting-ground here was within one league of perpetual snow. Punin is situated nearly due south of Riobamba, and not more than 2 leagues distant from that city, judging by Villavicencio's map. On the whole, the places, where the present collection was formed, lying near together, the sixty species of birds hereafter enumerated may be taken to give a good idea of the general character of the ornithology of this elevated plateau, concerning which heretofore absolutely nothing has been known.

As in my previous communication upon Mr. Fraser's collections, I have made frequent extracts from his notes upon the colours of the soft parts, food, habits, &c.

1. *TURDUS GIGAS*, Fraser.

Titiacun and Matos. "Common, rather a good songster. Irides red hazel, rim round the eye yellow. Bill red. Legs orange. Contents of stomach dark purple fruit." Mr. Fraser has forwarded the nest and two eggs of this Thrush, which are now in the British Museum. The nest is made of stalks and grass, lined with fine hay. The eggs appear rather small for the bird, measuring 1·3 by 1·0 inch. They are of the usual character of *Turdus* as regards colour, being of a bluish green minutely freckled with pale red.

2. *TURDUS CHIGUANCO*, Lafr. et D'Orb.

Riobamba. "Common, but very shy. Seen on the ground in swampy places. The stomach of one contained maggots, insects, and a small tadpole."

3. *ANTHUS BOGOTENSIS*, Sclater, P. Z. S. 1855, p. 109. pl. 101.

One specimen, a female. "There were two together running on the ground amongst the grass in the mountain. Irides dark hazel; base of lower mandible whitish; remainder of bill black; legs, feet, and nails delicate flesh-colour. Contents of stomach insects."

Anthus rufescens, Lafr. et D'Orb., is perhaps the same bird; but the specific name has been previously used in the genus. To establish the identity specimens must be compared.

4. *TROGLODYTES SOLSTITIALIS*, sp. nov.

Saturate murino-brunneus, alis et cauda intus nigricantibus, extus dorso concoloribus, fasciis angustis transversis nigris distincte notatis: striga postoculari et lateribus capitis cum pectore antico dilute fulvis, gula albicantiore, regione auriculari obscura: abdomine albido, hypochondriis et crisso nigro subobsolete transfasciatis: rostro fusco, subtus albicante: pedibus fuscescenti-carneis.

Long. tota 3·9, alæ 1·9, caudæ 1·3, rostri a rictu ·6, tarsi ·8.

Matos and Pinipi, 2 ex. Irides dark hazel.

This little Wren is just of the same form as *Troglodytes furvus*, *T. hornensis*, and *T. ædon*, but is readily distinguishable by the fulvous colour of the breast. I can find no described species that agrees with it.

5. *CINNICERTHIA UNIBRUNNEA* (Lafr.). — *Limnornis unibrunnea*, Lafr. Rev. Zool. 1853, p. 59.

Matos, 2 ex. "Irides hazel; bill, legs, and feet black. Contents of stomach insects. From a flock of four or five, in the high bushes, running up and down the trees and branches." One specimen has the lower mandible yellow.

6. *SETOPHAGA RUFICORONATA*, Kaup, P. Z. S. 1851, p. 49.

Matos, 3 ex. Irides hazel; legs, bill, and feet black. Contents of stomach, insects.

7. PETROCHELIDON CYANOLEUCUS (Vieill.).

Riobamba, 2 ex.

8. DIGLOSSA PERSONATA (Fraser).

Pinipi, Matos, Titiacun, 3 ex. Sexes alike, but female smaller. *Azulejo chico*, Spanish. Irides red. Among the trees on the mountain, feeds on insects.

9. DIGLOSSA ATERRIMA, Lafr.

Titiacun and Matos, 2 ex. Irides dark hazel. "On the bushes and trees on the hill-side, very restless, has a very pretty song." Food, insects.

10. EUPHONIA NIGRICOLLIS (Vieill.).

Matos, 1 ex. ♂. Irides hazel; bill blackish above, bluish beneath; legs and feet bluish flesh-colour.

11. PÆCILOTHRAUPIS LUNULATA (DuBus).

Matos, 3 ex., ♂ et ♀ similes. Called "*Grillos*," i. e. Chains (for the feet). Irides red hazel; bill, legs, and feet black. "These birds frequent the lowest and thickest bushes, where they hide. They are shy, and consequently difficult to procure. They appeared as if flycatching, darting from the bush and returning to it again near the ground. I presume their name is taken from their note, which somewhat resembles the clanking of chains on prisoners' legs. Their gizzards contained green vegetable matter and minute seeds, but *no insects*."

12. BUTHRAUPIS CHLORONOTA, Sclater, P. Z. S. 1854, p. 97. pl. 64.

Matos, ♀, 1 ex. Irides hazel; bill black; legs and feet blackish. Stomach contained green vegetable matter.

13. TANAGRA DARWINII, Bp.

Riobamba, 2 ex. "Stomach contained green vegetable matter."

14. BUARREMON PALLIDINUCHUS (Boiss.).

Matos, 2 ex. "Irides light hazel; bill blackish; legs and feet light brown. Found in the bush-heaps formed for clearing. Gizzard contained insects and vegetable matter."

15. BUARREMON SCHISTACEUS (Boiss.).

Matos, 2 ex., ♂ et ♀ sim. "Irides light hazel; bill, legs, and feet black. In low bushes on the sides of the mountain."

16. PHRUCTICUS AUREIVENTRIS (Lafr. et D'Orb.).

1 ex., ♂. Above Punin and Riobamba.

Finding this bird here, I begin rather to question its specific distinctness from *P. chrysogaster*.

17. PHRYGILUS ALAUDINUS (Kittlitz), Bp. Consp. p. 476.

Above Punin, 1 ex., ♂ "*Trigo*. Irides hazel; bill, legs, and feet yellow. On the small bushes and stones, taking flight like a Fly-catcher or Humming-bird, although no insects were found in the stomach."

I am somewhat surprised at the appearance of this bird so far north, but it agrees sufficiently with Chilean specimens.

18. PHRYGILUS OCULARIS, Sclater, *antea*, p. 454.

Riobamba, 1 ex. ♀.

19. ZONOTRICHIA PILEATA (Bodd.).

Riobamba.

20. CATAMENIA ANALOIDES (Lafr.), Bp. Consp. p. 493.

Riobamba and Guano.

21. CATAMENIA HOMOCHROA, sp. nov.

Saturate cinerea, crisso rufo, rostro pallide flavo : pedibus corylinis.

Long. tota 4·8, alæ 2·6, caudæ 2·0.

Matos, ♂, 1 ex. Irides dark hazel; bill flesh-colour; legs and feet light brown. In the stomach, comminuted green vegetable matter.

22. CHRYSOMITRIS ICTERICA (Licht.)?

Flavo-olivaceus, dorso nigro subobsoleto variegato, uropygio flavicantiore : capite toto antico undique cum gula nigerrimo : subtus flavus : alis nigris, fascia lata ad basin remigum flava, secundariis ultimis albo marginatis : cauda nigra, basi flava : rostro et pedibus nigris.

♀ *dilutior, subtus albicantior, colore capitis et gulæ nigro carens.*

Long. tota 4·2, alæ 2·6, caudæ 1·7.

Riobamba, 1 ex. Spanish name "*Jilguero*." Common; contents of stomach small seeds.

23. STURNELLA BELLICOSA, De Fil.

Matos and Riobamba, 2 ex.

24. CASSICULUS LEUCORHAMPHUS, Bp.; Bp. Consp. p. 428.

Matos, 4 ex. "*Cassiquillo*." Irides blue; bill blackish; legs and feet black. Contents of stomach vegetable matter. "From a flock of eight or ten in the trees. Very noisy. Said to make a hanging nest."

25. CYANOCITTA TURCOSA, Bp. Compt. Rend. xxxviii. p. 830. Notes Orn. p. 8.

Matos, 3 ex. "*Azulejo grande*." Irides nearly black; bill, legs

and feet black. Solitary on the mountain-side amongst the trees. Gizzard contained vegetable matter.

26. *SYNALLAXIS* — ?

Matos, 1 ex. injured.

27. *MARGARORNIS SQUAMIGERA* (Lafr. et d'Orb.), Sclater, P. Z. S. 1855, p. 142.

Titicun and Pinipi. Irides dark hazel; bill brownish above, whitish beneath; legs and feet brownish. Gizzard contained coleoptera, &c. This bird runs up and down the trees.

28. *GEOSITTA* — ?

Above Punin, 1 ex. Very much damaged.

29. *GRALLARIA SQUAMIGERA*, Fl. Prevost, *antea* p. 280.

Matos, 3 ex. "*Shumpo*." Irides very dark hazel; bill black above, nearly so beneath; legs and feet blue. "On the ground and in low bushes. The flesh is much prized for eating."

30. *AMPELION ARCUATUS* (Lafr.).

Matos, 3 ex. "*Asparagun*." Irides light hazel; bill dark red; legs and feet very deep orange. "Stomach contained fruit. In the trees on the tops of the mountains. A very sweet note."

The female of this bird wants the black cap of the male, having these parts green like the back, with the throat yellowish, barred with black like the belly.

31. *AMPELION RUBRO-CRISTATUS* (Lafr. et D'Orb.).

Matos and Titicun, 6 ex. "*Cavallero*." "Irides red; bill white, tipped with black; legs and feet very dark olive. Stomachs contain fruit. A very pretty bird, in the trees active and shy. The moment it alights, it squats down, or as it were lies across the branch."

Mr. Fraser adds—"sexes said to be alike, though the young differ." But the only female, so marked, is olivaceous, flammulated with yellow above and below, and without the red crest. This is perhaps young.

32. *AGRIORNIS SOLITARIA*, sp. nov.

Nigricanti-cinerea, subtus dilutior; loris, capitis lateribus, gutture et ventre imo sordide albis: gula obsolete striata: secundariis alarum albo extus anguste marginatis: tectricibus subalaribus albis, ochraceo tinctis: caudæ rectricibus lateribus a basi albis, duabus intermediis dorso concoloribus: rostro et pedibus nigris.

Long. tota 9·5, alæ 5·0, caudæ 4·0.

Aff. *A. maritimæ* ex Chilia, sed colore obscuriore et rectricibus a basi albis prorsus notabilis.

Titiacun, 2 ex. ♂, called "*El solitario*." Irides grey. Contents of stomach grasshoppers and other insects.

I have had an example of this bird in my collection for some time. It was received from Verreaux, and is marked '*Quito*.' Mr. Fraser remarks that it has a "loud distinct single note, which is repeated several times."

33. *OCTHOECA FUMIGATA* (Boiss.).—*Tyrannus fumigatus*, Boiss. Rev. Zool. 1840, p. 71.—*Tyrannus boissoneauui*, Bp. Consp. p. 191.

Matos, 1 ex. ♂. "Irides white; bill, legs, and feet black. Found on the bushes."

The proper place of this bird is evidently somewhere here among the *Fluvicolinæ*. For the present I am content to place it in the same genus as the next following species, to which it is closely related in general structure, though it must perhaps ultimately be removed into a different section.

34. *OCTHOECA FUMICOLOR*, Sclater, P.Z.S. 1856, p. 28. pl. 117.

Titiacun, 1 ex. ♀. Irides dark hazel; bill, legs, and feet black. Food insects.

35. *OCTHOECA LESSONI*, Sclater, P. Z. S. 1856, p. 28.—*Tyrannula rufpectus*, Less.

Matos, 2 ex. Irides dark hazel; bill, legs, and feet black. Food insects.

36. *SERPOPHAGA PARULUS* (Kittlitz.).

Titiacun and Matos, 2 ex. Irides dark hazel. "On the bushes, very restless: food insects."

37. *MYIOBIUS CINNAMOMEUS* (Lafr. et D'Orb.); P.Z.S. 1855, p. 149.

Pinipi, 1 ex. ♂. "Irides dark hazel." Agrees with Bogota skins.

38. *ELAINIA GRISEIGULARIS*, sp. nov. (Pl. CXLVI. fig. 1.)

Sordide olivacea: crista brevi verticali ad basin alba: alis caudaque sordide nigris, illis albo bifasciatis, secundariis quoque extus albo anguste marginatis: annulo oculari albo: subtus grisea, abdomine medio albo, hypochondriis et crisso flavican- tibus: rostro superiore nigricante, inferiore corneo: pedibus nigris.

Long. tota 5·0, alæ 3·0, caudæ 2·4.

Riobamba, 1 ex. "Irides very dark hazel."

39. *ELAINIA STICTOPTERA*, sp. nov. (Pl. CXLVI. fig. 2.)

Fusco-olivacea, pileo cinerascente, superciliis elongatis albis: alis nigris albo late bifasciatis; remigibus secundariis dorso proximis albo, ceteris omnibus flavo extus anguste marginatis:

subtus alba, tectricibus subalaribus et crisso limonaceo-flavidis: cauda obscure cinerea, olivaceo limbata.

Long. tota 4·5, alæ 2·6, caudæ 2·5.

Matos, 1 ex. Spanish name "*Platerito*." Bill black; legs and feet blue; stomach contained insects.

40. *ANTROSTOMUS* — ?

Matos, 1 ex. ♂ Irides black.

41. *PATAGONA GIGAS* (Vieill.).

Riobamba, 5 ex. "Irides dark hazel; bill and feet black: killed while hovering round the tall blossoms of an aloe." In the stomach of one were noticed "insects and their eggs."

42. *DOCIMASTES ENSIFER* (Boiss.).

Matos, 2 ex. Irides hazel; bill black; legs and feet flesh-colour. "On the top of the mountain among the flowers of the *guando*. When on the wing, their long bills sticking out give them a very strange appearance."

43. *PETASOPHORA IOLATA*, Gould.

Riobamba and Guano, 6 ex. Irides dark hazel; legs, bill, and feet black.

44. *LESBIA AMARYLLIS*, Gould.

Pinipi, Titiacun and Riobamba, 8 ex. Irides dark hazel; bill, legs, and feet black. Food insects.

45. *METTALLURA TYRIANTHINA* (Lodd.).

Matos and Pinipi, 4 ex. Irides dark hazel; legs, bill, and feet black.

46. *TROGON PERSONATUS*, Gould.

Matos, 3 ex. "*Pilco*." "Irides dark hazel; rim round the eyes red or very deep orange; bill, feet, and legs yellow. High up in the mountain, on the tops of the trees. Stomachs contained fruit, vegetable matter, and insects."

47. *COLAPTES ELEGANS* (Fraser).

Matos and Titiacun. Irides red hazel; bill black; legs and feet bluish.

48. *CHLORONERPES* — ?

Matos, 1 ex. ♂. I cannot reconcile this bird with any described species, and it is very probably new. Before describing it, I intend to submit it to the examination of M. Malherbe, who is preparing a Monograph of the family.

49. *MILVAGO MEGALOPTERUS* (Meyen).

Above Punin, 2 ex., ♂ et ♀, a pair—" *Churiquinga*," a name properly belonging to *Polyborus braziliensis*. Irides hazel; skin

of chin and throat wrinkled, and together with face and cere deep orange. "Found in pairs on the plains. Stomachs contained maggots, wheat, and vegetable matter. Said to be good eating. In Ambato I saw two on the roof and one at the door of a mud hut."

These specimens differ from the ordinary adult plumage of *M. megalopterus* in having the belly and sides more or less spotted with black. Perhaps they are not adult?

50. *TINNUNCULUS SPARVERIUS* (Linn.).

Matos, 2 ex. "Irides dark hazel: cere and naked space round the eyes, legs, and feet yellow. Gizzard contained insects. Very common on the *Pajon* of Chimborazo: feeds on the ground."

51. *GLAUCIDIUM* — ?

Matos, ♂, 1 ex., "*Acavavita*." Irides, bill, legs, and feet yellow. In the stomach apparently the remains of a lizard.

52. *CHAMÆPELIA GRANATINA*, Bp. Consp. ii. p. 77.

Riobamba, 1 ex.

53. *ZENAIDA HYPOLEUCA*, Bp. Consp. ii. p. 83.

Riobamba, 1 ex. Irides dark hazel.

54. *CHLORCNAS ALBILINEA*, Bp. Consp. ii. p. 51.

Matos, 1 ex., *Torcaza*. Irides grey, rim round the eye red; bill, legs, and feet yellow. In the stomach a large yellow fruit.

55. *ORTALIDA MONTAGNII*, Bp. Compt. Rend. xlii. p. 875.

Matos, 1 ex., '*Pava*.' Irides naked; skin of throat, legs, and feet red; bill pale horn-colour; soles of the feet yellow. Not uncommon.

56. *NOTHURA* — ?

Matos, 1 ex.

57. *VANELLUS RESPLENDENS* (Tsch.).—*Charadrius resplendens*, Tsch. Av. Consp. 1843, p. 388; Faun. Per. p. 295.—*Vanellus ptilosceles*, Gray & Mitch. Gen. B. pl. 145.

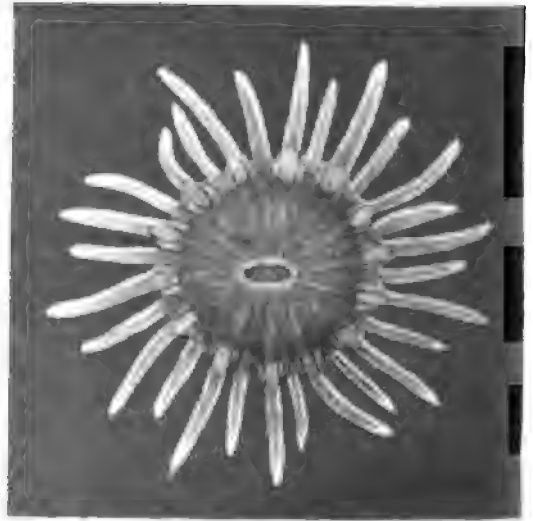
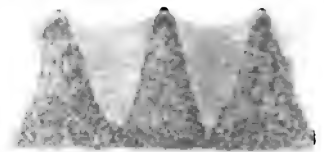
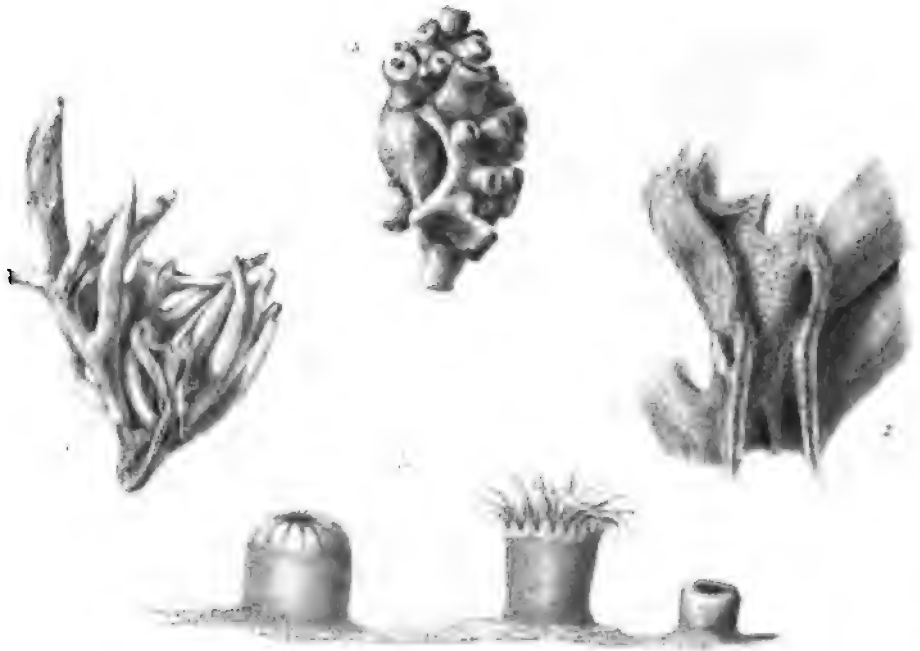
Above Punin, 2 ex., ♂ et ♀. Irides red, base of bill red, tip black, legs and feet red; ♂ with bill entirely red. Common in moist swampy places. Thousands seen in May, a month afterwards in the same spot only the present pair.

58. *TRINGA PECTORALIS*, Say.

Riobamba, 4 ex.

59. *TRINGA* — ?

Riobamba, 2 ex.



CHESL

13 Aph

Gay. 3-7. *Thamnia* (Loudon), *Chrysom* & *Sidisia* Barleei, Gay

3. ON *ZOANTHUS COUCHII*, JOHNSTON.
 BY E. W. H. HOLDSWORTH, F.L.S., F.Z.S., ETC.

(Radiata, Pl. X.)

The existence in our seas of a compound Zoophyte belonging to a group so essentially tropical as the *Zoanthidae*, was first made known by Mr. R. Q. Couch, who obtained a small species from deep water near the Cornish coast. It was subsequently described and figured in Dr. Johnston's 'British Zoophytes,' and has been since eagerly sought for, but apparently without success; or if captured, its characters have not been positively recognized. There is reason, however, to believe that the original description was imperfect; and it is probable that specimens of a compound Polype, found by Mr. Barlee and others along our northern coasts, and some lately obtained by myself in Torbay, may all be referred to *Zoanthus couchii*. They are certainly identical with the animal which Dr. Johnston placed with some hesitation among the Sponges, and described under the name of *Dysidea papillosa*; and this was believed by Prof. Edward Forbes to be the same as the Cornish *Zoanthus*. As the specimens recently found differ in some important particulars from those described by Mr. Couch, I have thought it desirable to point out their characters, and to give some details of certain parts of their structure which are peculiar to the family *Zoanthidae*, leaving their specific distinctness an open question, until we know more of the original *Zoanthus couchii*.

The living polypes now exhibited were dredged on the 12th of October last, in 10 or 12 fathoms water, at about a mile from the eastern headland of Torbay, and, although small, agree in other respects with the probably maturer examples from other parts of the coast. The special characters of the *Zoanthidae*, which consist in their increase by budding, and their mode of distribution over the surfaces to which they are attached, are subject in this species to considerable variation. One group of six polypes on the inside of a valve of *Cardium rusticum* (fig. 4), is arranged in a linear series as in the typical forms of the restricted genus *Zoanthus*, and is the result of budding in one direction only; others are scattered over the surface of a flat stone, and have no perceptible connexion with one another, except in a few instances where two or three of them are united; the isolated polypes are perhaps the produce of separate ova, and in time may develop their compound character by the usual process of gemmation. Another form of growth is the one under which this Zoophyte has been most commonly known as *Dysidea papillosa*, and may be well seen in a remarkably fine specimen from Shetland, and now in the collection at the British Museum. In this example the polypes form a compact group (fig. 3), connected in every direction by a general expansion of the basal membrane, which is extended over the whole outer surface of a small univalve shell, and also lines the interior for a considerable distance. Mr. Alder has observed that a *Natica* is the usual support for this form of development; but in this instance the shape of the incrusting mass is more like that of a small *Buccinum*, or a *Purpura*. In these varying modes of growth, we

find a gradual transition from the linear budding of *Zoanthus* proper to the aggregation of the polypes in some species of *Palythoa*, but in the typical members of the latter genus, the Polypes are not only connected at the base, but have their bodies also severally united so as to form a solid mass; and a more decidedly compound nature exists in them than we find in any of the varieties of the present species; so that, although partaking of the characters of both genera, *Zoanthus* appears to be the one to which this is most nearly allied. An evident approach to the same intermediate form may be observed in the reticulate arrangement of the connecting bands of *Z. bertholetii* from the Red Sea.

In our British species, the body forms a cylinder from 2 to 4 lines high, by about half that in breadth, and is clothed with a dense coating of fine sand, which at the upper extremity is divided into 14 deeply-cut marginal teeth; these cover the top of the column when the animal is closed, but are turned a little outwards during expansion. The tentacula are moderate in length, slightly tapering, smooth, and not capitate; they are arranged in two rows containing 14 each, of which the inner series are rather the longer, and are placed opposite the angular prolongations of the column, those of the outer row alternating with them. Fourteen tentacles in each row appear to be a character of specific value, as I find that number constant in specimens of various sizes, and they correspond with the marginal divisions. The disk (fig. 7), which is generally concave, somewhat exceeds the diameter of the body; and the prominent mouth opens with a simple linear orifice. The general colour of the disk and tentacula is a pale transparent brown, becoming opaque white around the mouth and at the tips of the arms; and all the intermediate parts are finely speckled with the same tint. At first sight, the tentacles appear to be knobbed as in *Corynactis* and some of the Coraligenous Polypes; but their form is really quite simple, and the capitate appearance of these organs is due solely to the conspicuous colour of their extremities.

Among the external characters of this family, the serrated margin of the column is remarkable, but an examination of the animal shows that this structure is a simple provision for enabling a polype so peculiarly coated to close its disk perfectly, and in the contracted state to be completely protected by its sandy covering. Closure of the disk in the soft-bodied *Actiniae* is effected by the action of the muscles surrounding the upper extremity of the body; and as the skin is soft and yielding, contraction takes place equally on every side, and is continued until the edges of the column meet in the centre. In *Zoanthus*, the case is different; fine sand being densely impacted into the epidermis, little or no contraction can take place, and the polype would be unable to close in the usual manner if this hard covering were uniformly extended to the margin of the disk. Under the microscope, the wall of the column is seen to terminate in a number of triangular processes or teeth (fig. 6), united at the base, and covered externally with sand like the rest of the body; these prolongations are connected throughout their length by a thin membrane, which is crossed by the ordinary transverse muscles, whose contraction

brings the edges of the teeth in contact, at the same time necessarily inclining them towards the centre, and thus effectually closes the disk; the animal being then entirely covered and protected by the investing sandy coat. It will be observed that the apparently marginal teeth are in reality only parts of the wall of the column, and that intervening triangular pieces are as it were excavated from the integuments, leaving only the internal membrane and muscular bands. The nature of this adventitious covering also deserves attention, being the only character in which this polype at all resembles *Dysidea fragilis*—the sponge with which it was formerly associated. It is almost entirely composed of fine angular particles of siliceous sand, brought in contact with the body and connecting membrane of the polype by the action of the sea, and retained by, and incorporated in the cuticle; its extraneous character is evident from the occasional presence of other matters mixed with the sand, but the latter substance is in most cases the only material employed. Similar grains of sand abound in the sponge; they are not confined, however, to the exterior, but are scattered throughout the mass, and cover the inter-lacing fibres in every direction.

Independently of its different composition, this sandy coating in *Zoanthus* cannot be regarded as at all analogous to the true corallum of the Madreporæ; here it is the actual polype which is enclosed in the hard covering, and this, when tested with nitric acid, shows no trace of calcareous matter; in the Madreporæ, on the contrary, the polype is as delicate and soft-bodied as any of the Actiniæ, and when expanded, rises above and clothes the upper portion of the corallum, which is entirely secreted by the internal tissues of the animal, and is composed essentially of carbonate of lime extracted from the seawater; in fact, the hard parts constitute an external covering in the one animal, and an internal skeleton in the other.

In its explanate growth, or increase by budding from the base only, *Zoanthus* strongly resembles *Caryophyllacea*, and by some naturalists is associated with that tribe of Coralligenous Polypes; but many of its characters point to a nearer relationship to the *Actinidæ*, in which we sometimes find a similar deposition of extraneous matter on the cuticle, although in a slighter degree and less persistent: the smooth simple tentacula are also very unlike those of the Coral Polypes, in which their surface is generally studded with little wart-like prominences enclosing the thread-cells. With our present scanty knowledge of the *Actinidæ* found in different parts of the world, and the insufficient descriptions that we possess of most of the coral animals, it is difficult, if not impossible to determine, the true position of the *Zoanthidæ* among the Helianthoid Polypes. An examination of the tropical seas, in which they abound, and where they attain a size considerably exceeding that of our British species, may lead to the discovery of intermediate forms showing the true affinities of this now isolated group; but at present I am inclined to regard them as representing the budding form of growth in the Non-coralligenous Zoophytes, as the fissiparous mode of increase is exemplified in many of the true *Actinidæ*.

On the 9th of November last, Dr. Gray brought before this Society a notice of a curious form of *Zoanthus* sent to him by Mr. George Barlee from the Shetland seas, and for the reception of which he proposed the new genus *Sidisia*. He has kindly allowed me to describe this polype (fig. 8); and it is therefore with some regret that, after a careful examination of it, I must question its generic or even specific distinction from *Zoanthus couchii*, the subject of the previous part of this paper. The great peculiarity of these polypes consists in their being entirely free, no parts of the specimens at the British Museum showing any superficial trace of attachment. Another remarkable character is their irregular mode of budding, and may be briefly described as one polype growing out from another without the intervention of the usual connecting bands; this budding takes place from the base of the parent polype in an opposite direction, or at various angles with the original line of growth, the branches again sometimes throwing out buds from near their own bases. Mr. Barlee states that some of the specimens were attached, but most of them came up in the dredge free, and that they abounded on muddy ground. This situation is I think very significant, and sufficient to explain the peculiarities of the animal. As I have before mentioned, it is the habit of *Zoanthus* to be attached to some stone or shell, and the first sign of its increase is in the expansion of the basal membrane either on one or all sides of the polype; from this expansion the young bud forth at various distances from the parent, and they in time develop similar offshoots. Such is the case when the ova fall on places suited to their natural growth; but if by chance they are deposited on a muddy bottom, or where the stones are only large enough to afford attachment to a single polype, I think an irregular mode of growth may be reasonably anticipated, and a variation expected in the character which, above all others, is likely to be affected by the change of circumstances. By the motion of the sea, the position of these free polypes must be continually shifting, consequently no part of their surface can be permanently uppermost; and under these circumstances, with a natural tendency to grow upwards, regularity of budding would seem to be impossible. As might be expected, scarcely two of the specimens I have seen, are precisely alike, which adds to the probability of the suggested explanation of their irregular growth. The fact of the characters of the disk, and the number of the tentacula and marginal divisions being identical with those of the animals first described, is a strong argument also in favour of their all being only different forms of the same species.

Mr. Salmon exhibited at the Meeting a female bird of Baillon's Crake (*Crex Baillonii*) with seven eggs; they were taken by a fennman in Cambridgeshire, the bird having been ensnared during the first week in August upon the nest, which was placed upon the ground. This is the first authenticated instance of this species having bred in the British Islands. The bird and eggs belong to Mr. William Farren, of Cambridge.

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